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A CASE
OF
LOSS OF POWER
OVER THE
VOLUNTARY MUSCLES.

By JOHN BOSTOCK, M.D.

Read Dec. 23, 1817.

THE following case, which I submit to the notice of the Society, will perhaps not be read without some degree of interest, from the pathological information which it contains, although I am aware that, in the minds of those who witnessed its progress and termination, the great interest which it excited was principally derived from feelings of sympathy and commiseration.

Mr. H., a middle-sized and well-formed man, between thirty and forty years of age, who had enjoyed good health and possessed considerable activity both of body and mind, applied for medical advice, in consequence of a pain which he experienced in one of the lower extremities. Its seat

was on the outside and a little above the knee, but it sometimes shot up to the hip: it was neither constant nor severe, but it seemed to be increasing, and he found that it produced a degree of stiffness in the limb, which rendered him less able to make any unusual exertion, as in skipping or running. He mentioned that some months before, he had slipped backwards down the stairs of a ship's cabin, but nothing more than a slight bruise seemed to be occasioned by the accident, and a considerable time had elapsed between the fall and the commencement of his present complaint; he did not himself attach any importance to the circumstance.

After an interval of two months, his power of moving the limb was perceptibly diminished; so that he had occasionally been in danger of falling, in consequence of his not being able to raise the foot sufficiently, in stepping over any thing or in going up stairs. Upon noticing more particularly his manner of walking, I was able to perceive a degree of dragging of the limb, arising from a loss of voluntary power over the action of the muscles. The pain in the mean time had advanced rather more towards the upper part of the thigh, but it was still neither constant nor acute. During the next two months the complaints continued slowly to increase; the pain of the limb was not indeed much more severe, it possessed its full share of sensibility to external impressions and was of the natural temperature, but he lost more and more

the command over its motions; when he walked he dragged it after him in an awkward manner, and when he made an effort to raise the foot, it was brought up higher than he intended, or in an oblique direction. During this time there had never been any pain in the trunk of the body, nor upon a very minute examination, could any disease be detected in the spine. The general health, however, began to be a little impaired; the appetite declined, the bowels became irregular, and there was a tendency to an hæmorrhoidal affection.

After another interval of about two months, the other limb was perceived to be affected; Mr. H. lost, in some degree, the command over it, and he felt shooting pains about the knee and the hip-joint. A new symptom now appeared, which was peculiarly distressing: when he had been sitting or lying for some time, and first put his feet to the ground, a sensation darted through the legs something similar to what we experience when the limbs are said to be asleep. This caused him to draw them up with an involuntary jerk, and, for a few moments, he felt very acute pain from this kind of exertion. There was, however, no numbness of the limbs at other times, and when they were once firmly placed on the ground, the darting pain was no longer felt. Shortly after this period a new affection made its appearance, a difficulty in the articulation of particular words, and for the four next months, the affection of the speech and of the limbs

continued to increase, so that he became unable to move without assistance, and his power of utterance was nearly lost; the bowels were very irregular, and there was some degree of general emaciation.

About eight months after the commencement of the complaint, the patient was, for the first time, seized with pain in the back of the head and neck, which was described as an acute, deep seated, darting sensation. It recurred in paroxysms, at uncertain intervals, and was, in some degree, relieved by lying down; it was observed, that after one of these attacks, all the other complaints were aggravated, and the functions considerably disturbed. In the mean time, the general affections were advancing with a slow but regular progress, and in addition to his other calamities, Mr. H. now began to experience a stiffness in his hands and arms, which at first prevented him from writing, and at length from performing the common offices of life. Some time after the commencement of the paroxysms described above, the deglutition became sensibly affected, and soon afterwards there was a loss of power over the muscles of the jaws and the neck.

His situation was now so truly deplorable that a speedy termination to his existence was ardently hoped for by his friends; but he was destined to experience still greater sufferings. For the six

following months his complaints continued to increase, until he was reduced to a state of complete helplessness. The motion of the lower extremities and the power of articulation were entirely lost, and the action of the hands and arms was very nearly so, deglutition was become extremely difficult, and the jaws could only be opened just so far as to receive between them a small tea-spoon. His head fell down upon his chest, unless when artificially supported; there was a constant flow of saliva from the mouth, and he was frequently almost suffocated with mucus, or convulsed with the ineffectual efforts to expel it. He was occasionally affected with violent shooting pains in all the limbs, and his whole body was become so rigid, that not only was he unable to perform any motion without assistance, but it required considerable force to bend his body, so as to place him in a chair, when he had been in bed, or to extend him in bed after he had been for some time sitting in his chair. His nights were moreover restless, and he could not lie in one posture for any length of time without great uneasiness. A large part of the day was necessarily occupied in taking in, by very small quantities and in a very slow manner, a sufficient quantity of nutriment to satisfy the calls of hunger. Yet notwithstanding this loss of voluntary power over the muscles, there was no numbness or insensibility of any part of the body, either to mechanical impressions or to changes of temperature, and all the external senses and the mental faculties remained un-

injured; he exhibited a very considerable degree of ingenuity in contriving different methods of communicating his ideas to those around him, and at times manifested even a degree of cheerfulness.

Mr. H. was condemned to drag on this wretched state of existence for six months longer; the rigidity of the limbs increasing, his pains becoming more violent, the cough more harassing, the difficulty of deglutition every day threatening its total suspension, and his nights becoming more restless, yet his senses, both mental and corporeal, remaining unimpaired. For some time before his death, the upper extremities, as well as the lower, were entirely motionless, and the only method he had of expressing his wants was by pushing his body against a moveable staff, which communicated with a board, on which the letters of the alphabet were placed, and by varying the degrees of motion, the staff was made to point to the different letters.

About three months before his death, in addition to the ordinary and now constant pains, Mr. H. had occasional paroxysms of a more violent kind. As far as we could understand his description, they commenced with an acute throbbing, which darted down the back of the head and neck, terminating in a complete rigidity of the whole body, and a temporary suspension of the faculties. He was always much debilitated by these attacks, and obviously worse after them, and it was immediately

subsequent to a violent seizure of this kind that he expired. A few days only before his death, his sight became indistinct, and there was some degree of strabismus, but there was no other affection of any of the functions connected with the nervous system, and the intellectual faculties remained unimpaired to the last. The state of the spine was examined several times during the course of the disease, and at these examinations, Dr. M'Cartney and Mr. Christian of Liverpool assisted, but nothing morbid could be discovered in its form or condition. Various remedies were prescribed by myself, in conjunction with the above gentlemen, but of these I think it unnecessary to give any account, as no benefit was derived from them.

Permission was obtained to examine the body after death, and I accompanied Mr. Christian for this purpose, anxious to discover the physical cause of such a long continued and extensive train of complaints. We began by examining the brain, and every part of it was most minutely scrutinized, but without our meeting with any appearance which could be considered as morbid. We had already consumed so much time in this part of the examination, that we determined to remove the basis of the cranium and the cervical vertebræ for a more minute dissection at our leisure, but we were not a little surprised, after a very careful investigation of the whole, to find every thing apparently in a natural state. After a very accurate survey of

every part, we thought that we observed a slight furrow across the spinal cord, as if it had been compressed by a transverse ligature, and this in the place where it passes under the ring of the atlas; and upon attentively noticing this part of the bone, it appeared a little thickened and of a yellowish colour. These appearances, however, were not very distinct, and the change of structure existed in so slight a degree, that it would probably have escaped observation, had any other morbid derangement presented itself to our notice.

In reviewing this case, perhaps the most remarkable circumstance is the want of correspondence between the degree of disease, and the morbid state of the parts as discoverable upon dissection. It was farther remarkable in the voluntary power being so totally destroyed in all parts, while the other functions connected with the nervous system, as far as we could judge, were nearly unimpaired. The power of the nerves to convey impressions from their extremities to the brain was nearly in its natural state, while their power in transmitting the acts of the will from the brain to their extremities was totally destroyed, yet there was nothing in the state of the brain which could throw any light upon this circumstance. The confident expectation of the medical attendants was, that some disease would have been detected at the base of the cranium or upper part of the spine; yet, except what has been stated with respect to the atlas, nothing of this

kind was discovered. Are we then to conceive that this slight affection of the bone was the source of all the morbid symptoms, or are we to attribute the complaints to some disease existing in the lower part of the spine? It is to be observed, that although the voluntary motions of all kinds were so completely interrupted, all the involuntary motions were continued nearly in their natural state. The affection of the chest and that of the intestines seemed to depend almost entirely upon the defect of voluntary motion in these parts; for the *ordinary* action of the chest was performed in the natural manner, and there were several circumstances which made it probable that the difficulty which attended the evacuation of the bowels, arose principally from the want of co-operation in the muscles of the abdomen, and those connected with the rectum. In the last place, I may remark upon the peculiar rigidity of the voluntary muscles, a circumstance which was independent of their being no longer under the control of the will; and this rigidity does not seem to have been what we ought to denominate spasm, because there was no permanent contraction in them. Whether they were contracted or relaxed, it was found equally difficult to bring them into the contrary state, and to this circumstance, as well as to the loss of voluntary power, many of the most distressing symptoms ought probably to be referred.

While there is so much obscurity concerning the physical cause of the train of symptoms which oc-

10 DR. BOSTOCK ON LOSS OF VOLUNTARY POWER.

curred in this case, we cannot expect to obtain any correct knowledge of its pathology. Is it probable that it was entirely an affection of the voluntary muscles and not of the nervous system, in which the nerves transmitted their influence in the natural manner, but where the muscles were incapable of receiving it, or being acted upon by it? I am not aware that such a morbid condition of the muscles is recognised by nosologists ; but I think it will be difficult to account for the symptoms upon the supposition of their originating solely in a disease of the nervous system, and indeed except in so far as respects the faculty of volition, we have no decisive proof that the nervous system was in any way diseased.

HISTORY OF A CASE
OF
CÆSAREAN OPERATION,

IN WHICH THE
LIVES OF THE MOTHER AND CHILD WERE BOTH
PRESERVED.

By J. J. LOCHER, M.D.

TOWN PHYSICIAN OF ZURICH.

COMMUNICATED

By J. A. ALBERS, M.D.

OF BREMEN.

WITH A FEW PRELIMINARY OBSERVATIONS BY THE LATTER.

Read January 5, 1818.

IT is a most remarkable circumstance, that in a country like Great Britain, where beyond all doubt the boldest operations of every description have been performed with success, the cæsarean operation should never have been attended with the same fortunate result as in other countries. It is but too true, that in that country there has not hitherto been a single case in which the life of the mother has been saved by this operation. Such was the information I received from Dr. Haighton, during

my stay in London in 1798, and the same fact was repeated to me lately by Professor Lawrence in one of his last letters, when I had given him an account of this case and of another to be mentioned hereafter. When, therefore, I learned that in the beginning of this year the cæsarean operation had been performed by Dr. Locher, the universally celebrated accoucheur at Zurich, with such success, that the lives of both the mother and child were saved; I requested him to favour me with the communication of the case, that I might lay it before this Society, to which he politely consented. Although the truth of his relation does not in any shape admit of a doubt, and the revered name of Locher is sufficient security, yet the original statement of the operation, which was forwarded to me, is not only attested by the signature of the archiater, Dr. Rahm, but also by the seal of Mr. Hottinger, the magistrate and the third town-secretary; which original document, together with a letter directed to me for the purpose, I have the honour to send to the Society herewith.

A second case of the cæsarean operation was, on the 16th of May of this year, performed at Minden by my friend there, Dr. Nicholas Meyer, in which the mother's life was saved, but the child bore every indication of having died before the delivery. In No. 66. Vol. III. of the Salzburg Medico-Chirurgical Journal of this year, this case has been

briefly described, and in corroboration of the truth, I also add to it a juridical and sealed certificate.

J. A. ALBERS, M.D.

On the 16th of February, 1817, at three o'clock in the morning, I was summoned to a woman of this town in labour; she was said to be incapable of bringing forth her child.

On my arrival I found a little woman out of bed, who in her early youth had been rickety in a very high degree, and had attained the age of eight years before she could stand without assistance, and still less could walk. The head and upper part of the body were well formed; but from the os ilii downward, the frame was entirely crooked, and particularly the leg and thigh quite twisted.

She had pains at this time; but, upon examination, the orifice of the uterus was discovered still to be situated very high, and to be but little opened. Behind it there was a hard body, which I took for the head; at a very great distance indeed, scarcely attainable with the finger. As for the rest, the woman had laboured before under spasms, and the present pains appeared spasmodical fits, rather than true labour pains. I prescribed for the patient anodyne remedies and steam-baths, and recommended

her to go to bed, and as the weather proved rather cold, to keep herself warm. When after a second examination, I observed no change in the orifice of the uterus, nor any increase of pains, I left the person about six in the morning, and enjoined the midwife present, to observe her attentively, and inform me of every alteration. She made use of the prescribed medicines regularly, and towards ten o'clock I paid her a second visit.

She was in a heated state, owing (as she told me) to the continual pains; the waters had not yet flowed off; upon examination the orifice was found a little more opened, so that behind it, though in an oblique position and extremely high, I could distinctly feel the head of the child. During the pains, which the woman experienced with great vehemence, not the least protrusion forwards of the foremost parts of the head was felt; and in that very height, it already appeared to be wedged in. Some examinations performed successively during the pains, convinced me of the existence of a pelvis quite irregular and crippled by rachitis.

The aperture of the uterus being yet so small, that the application of the forceps or other assistance could not be thought of, I left the patient towards twelve o'clock, with the same directions as I had given in the morning, and the information that I should again visit her at three o'clock, in hopes that during the interval the uterus would open suf-

ficiently to admit the forceps or some other assistance.

Convinced that if even the forceps could be applied, a very difficult labour awaited me, which would in a very high degree exhaust my strength, I requested one of my colleagues, Dr. Spoendly, to attend and support me in this labour. On our arrival after two o'clock in the afternoon, I made an examination during a pain, and found the orifice of the uterus much more dilated than I had found it three hours before, and behind it a small pointed bladder, which in the pain shewed only little tension. Every thing hitherto exhibited by the examination, the inefficiency of the pains both on the chair and bed, the bursting of the bladder during such a pain (on which occasion indeed only a couple of spoonfulls of water escaped, and the head immediately was stopped) determined me, the orifice of the uterus being sufficiently opened, to apply the forceps, notwithstanding I beforehand questioned the possibility of executing my purpose; as after all my examinations, the pelvis in its conjugata measured not above two, or at most two and a half inches in diameter, and the remaining dimensions were in the same proportion. I now attempted to introduce the male lever of my forceps, bent to the axis of the pelvis, on Stein's and Brunninghausen's principles and my own, and, after conquering great obstacles, I succeeded, though in

a direction quite oblique. This position of the lever of the forceps already proved how difficult would be the introduction of the second. However, as under circumstances perhaps still more unfavourable, I had succeeded in attempts of this nature, I tried to introduce also the second, but all my efforts proved unsuccessful. The confined entrance into the pelvis did not permit the second lever to slide over the first. After repeated fruitless attempts, my assistant likewise tried the operation but with the same result. The pains which the woman suffered were extremely vehement and excruciating. Meanwhile the antispasmodic remedies were continued, and the patient kept in bed as quiet as possible.

Under these circumstances, and the absolute impossibility of applying the forceps, our consultation turned on two indications, viz. *perforation* and *the cutting of the child*, particularly as its head presented itself; or secondly, *the cæsarean operation*.

There was against the former indication the very probable impossibility of introducing the instruments requisite for the perforation, the unavoidable lesion of the parts adjacent, if the introduction were found practicable; and particularly the assertion of the mother, that still she felt the motion and quickness of the child, which likewise was distinctly perceptible to our hands, when laid on

the mother's body. We therefore determined on the second, under the conviction that by it the life of *one* at least might be saved.

The nearest relations who were present were apprized of the determination, and, with their approbation, the woman in labour likewise informed of it. After a few objections, she also soon came to a determination, and we prepared our apparatus and every thing that was necessary. After the injection of a glyster there followed stools and urine.

At five o'clock in the evening the operation was performed in the presence of several professional gentlemen, and in the manner following. I caused the patient to be placed in the position usual in herniotomy, in which the weight of the abdomen presses more against the diaphragm, and ordered her to be properly secured.

Having performed before a similar operation, I was induced to make the incision immediately upon the linea alba, as not a single blood-vessel of any importance had been injured on that occasion. Immediately beneath the navel the skin was pinched up into a fold, both it and the adipous membrane cut through, and the cut continued downwards to the length of from eight to ten inches. The sphere of the uterus, now appearing, extended the fat edges of the incision, so that there appeared a considerable vaulted surface of the womb. There pro-

truded also a portion of small intestine, which, however, was easily kept back by means of linen anointed with fat. In order not to cut through the uterus exactly in a place where the placenta might accidentally be situated, and thus excite a violent bleeding, I chose a somewhat uneven part of its surface, and there made a little incision, so that I could introduce the index of the left-hand, to serve as a guide for the progress of the knife. The uterus was then cut open from six to eight inches along the finger. Immediately the child presented itself, together with its membranes, yet without any water. The hemorrhage till then was a mere nothing. The nearest part of the child was an arm. This, as there was room enough, was disengaged first from the uterus, and after it carefully one part of the child after the other in succession, and last of all the head. Already before the head was freed from the womb, the infant moved its limbs, and on the developement of the head, to the greatest joy of the mother and all the attendants, it proved its life by loud cries, so that not the least thing was required to remove the asphyxia of the infant. The funiculus umbilicalis was severed, and the child entrusted to the waiting woman to be cleansed. In the right side of the womb was found the placenta, which, lying almost quite free, was now taken away. At this period a violent bleeding arose from the bottom of the uterus. The ligature of a blood-vessel, or any other styptical application was not to be thought of under these circum-

stances; but the blood was quickly absorbed from the uterus by means of a sponge, in order to leave the organ to its own contraction, and to close the wound of the integuments. To this I was the more induced, as a couple of years previously, on dissection, I had found in a person, who died eight days after the operation, the uterus quite contracted, and the labia of the wound in the same almost entirely united. I therefore joined the external teguments with five sutures, covered the wound with lint, and applied some adhesive plasters, confining the whole with a couple of compresses and a broad bandage.

The mother was now transferred to her bed. Neither fainting nor any other accident befel her. On the contrary, her joy and eagerness at seeing her child and having it by her were so powerful, that even whilst dressing the wounds we had much trouble to keep her easy. She now was presented with some good broth, which she ate with great appetite, and the greatest tranquillity was enjoined her. An emulsion with laud. liquid. Syd. and Tinct. Cinnam. was then prescribed for her.

At ten o'clock in the evening I again paid the patient a visit. She found herself quite tranquil, and complained of nothing but a burning in the wound. During the night, she enjoyed at intervals quiet sleep, which had often been interrupted by the cries of the child, for which reason it was re-

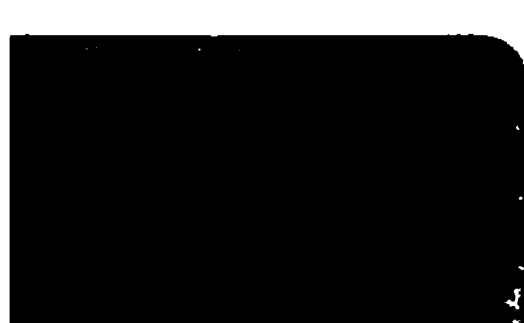
moved to another room. The blood began to flow from the vagina. The urine passed in the natural way. In the morning she took her coffee. The belly appeared considerably protuberant and tense, but not very painful to the touch. The superior part of the dressing, which was soaked with a serous fluid, was removed, and a new one very loosely applied; the internal remedies were continued, externally a friction of ol. anod. with hyosciamus and laudanum applied, and emollient clysters administered. The second day passed well, and without any material complaints, and also the third. The lochia flowed in due order, the belly grew softer; yet in spite of repeated clysters no stool ensued. The tongue became foul, for which reason, besides the former emulsion, a decoction of tamarinds with salts and manna was given. On account of the exuberant evacuation of serum and the appearance of suppuration with smell, the external dressing was daily renewed; as for the rest, the real dressing was kept on. In the night between the third and fourth day, abundance of flatulencies were developed, followed towards the morning by a stool. The belly was soft, the patient upon the whole well, quiet, and without fever. On the right side of the belly appeared the greatest tension, and the greatest pain was felt. Every thing was continued as before.

On the fourth in the morning, she found herself very well. From the very moment of the opera-

tion till now, partly for the sake of observation, partly in case of any immediate help being requisite, one of my assistants had remained with her. Towards noon I was sent for and requested to repair as quickly as possible to the patient, who was apparently dying. The better I had left the patient in the morning, the more unexpected and strange was this message to me.

On my arrival I indeed found the patient in a very indifferent situation. She experienced violent convulsive spasms, particularly in her head. She had a staring look, cold extremities, cold sweat on her brow : the urine had been discharged involuntarily. She recollected nobody, could neither speak nor swallow ; her breath was much oppressed, the pulse low and contracted ; her complexion saturnine: yet the abdomen was not much collapsed, which must have been the case had gangrene existed. None of the persons present were aware of the cause that in such a promising prognosis had occasioned a change so sudden and so distressing to the physician. She had still taken some soup, and then said, she felt very squeamish. Under these circumstances, and the patient not being able to swallow, I had no means left but to make her smell volatile essences and apply antispasmodic frictions, especially about the neck, to remove the convulsions and spasms, and restore the faculty of swallowing. This was effected after the space of a couple of hours, when an analeptic mixture was

given to her every hour, and every two hours some musk. Clysters and external frictions, especially round the neck, were continued. Towards evening, the evil, rather than increase, seemed to abate. Her speech returned, her warmth became equal, the skin moist, the pulse softer. Her weakness was very great. Being almost fully convinced that too great exertion in speaking and too great joy, in short, that passions had brought on this alteration, I prohibited all visits, and left the patient without any other company but two persons to watch her. The night was passed with varying symptoms, yet more tranquilly, and without fever or other accidents. The clysters took effect, recollection returned, the belly became rather more distended and painful. On my visit in the morning of the fifth day, she called out to me, "I have suffered severely; but at present I find myself very well." Most of the symptoms, indeed, had ceased, so that the highest state of quietude was once more to be recommended. The belly was soft; on the application of clysters there followed evacuations; the natural complexion and warmth returned; she felt much ease and comfort from changing beds. As there appeared a violent suppuration or rather a copious oozing of a strong-smelling serum, the dressing, all but the ligatures, was taken off, and put on again loosely in the same manner. The ligatures all were in the best order, and duly kept the labia of the wounds together. The interior treatment was not at all changed. From this time



the patient daily improved ; every day the external dressing was renewed. The belly collapsed visibly ; the uterus contracted more and more ; the lochia were discharged as they ought ; the milk appeared in the breasts, though but in a small quantity, so that this concern was entirely left to nature.

On the tenth day after the operation the ligatures began to form small pustules and thence give way. Two of them, which were the least tied, were removed, and the three remaining ones were left to hold as well as they could. The internal remedies were still continued, and especially the clysters. Four or five days later the three other ligatures were likewise taken off, and the wound treated as a simple sore, and kept together and supported by adhesive plasters only. Good fare, wine, &c. aided her strength.

The same treatment was continued till the 20th of March ; no disastrous accident occurred. All the functions of the body went on in the best order. The wound was cleaned and healed considerably from day to day. The patient remained without all medicines till the 27th, when on account of the uncleanness of the primæ viæ, some purging medicine was thought proper for a couple of days. The patient now daily spent a few hours out of bed, began to work, mind her child, and in short, except from the sore which was not very large, suffered not the least inconvenience. In the se-

venth week after the operation, the menses reappeared, though somewhat irregularly; since that they have occurred at due periods. From day to day her strength improved, so that in the eighth week she transacted most of her domestic concerns, and never more was confined to her bed during the day. In the twelfth week she paid me a visit in the best health, at my house, together with her admirably handsome and stout babe.

It appears surprising, that in the middle of this wound a little spot, not exceeding two or three lines in length and breadth, in spite of all the remedies applied for the purpose, will not close; and when thought to be healed up will again open, yet without any detriment to the mother. The child, now eight months old, may likewise be exhibited as a pattern of health, strength, and beauty.

J. J. LOCHER, M.D.

Town-physician.

Zurich, October 20th, 1817.

In compliance with the wish of my honoured friend the very skilful *accoucheur*, Dr. Locher, I corroborate the truth of this remarkable observation by my signature.

DR. AND ARCHIATER RAHN.

Zurich, October 20th, 1817.

The identity of the above signatures, which were affixed in the Senate House, is attested, Zurich, the 21st of October, 1817, by the third State Secretary of the Canton of Zurich.

(L.S.)

HOTTINGER.

Secreti Civium Turicensium.

A CASE
OF
INGUINAL ANEURISM,
CURED AFTER THE USE OF COMPRESSION.
By J. A. ALBERS, M.D.
OF BREMEN.

Read Jan. 20, 1818.

A SAILOR of the name of Lüder Bölcke, thirty-six years old, who lived in the neighbourhood of Vegesack, came on the 18th of October, 1816, to the surgeon of that place, Mr. Prohfs, in order to consult him concerning a complaint in the right groin. This gentleman found in that situation a strongly pulsating tumor as large as a hen's egg; and declared it immediately to be an aneurism. He advised the patient to go to Bremen, in order to consult Mr. Schmidt, the surgeon, and myself. The patient informed us that he had for a year remarked a swelling as large as a hazel-nut in the right groin, which, however, he took no notice of, as it occasioned him no inconvenience. He did not remember any circumstance which could have been the first cause of this swelling; on the con-

trary, he asserted, that after great exertion in his labour on board ship, in the month of September, the swelling had attained its present size within four weeks. He had hitherto experienced so little inconvenience from this aneurism, that it required some trouble to dissuade him from making a voyage to the West Indies, which he was then on the point of undertaking. I had been conversing the evening before with my friend, Mr. Schmidt, concerning the numerous operations, which have been performed in England for inguinal aneurism, and proposed that the artery should be tied; the patient, however, positively rejected this proposal, so that nothing remained for us but to try compression. For this purpose we gave him a compressorium, which, like the old rupture-bandages, consisted of a cushion fastened to a strap, which was buckled round the body. On the lower and inner side of the cushion there was also a strap, which was fastened round the thigh by means of a buckle. The cushion itself consisted of two iron pieces: the uppermost had the form of a common cushion, and was externally covered with leather: the lower piece was round, and covered below with strong cloth, and above with leather. It was connected with the upper piece by a screw, by the operation of which its pressure on the tumor could be increased or diminished at pleasure.

As the patient resided near twelve miles from Bremen, we heard nothing more from him at that

time; and what I now relate has been since communicated to me by Mr. Prohfs in Vegesack, and by the patient himself, whom I saw there in the end of the month of September in this year.

After he had borne the compression constantly for two months, he felt such a violent pain in the aneurism, and had such a considerable œdematous swelling in the thigh and leg, that he was forced to take off the instrument. Nevertheless the violence of the pain continued so as to confine him to bed.

During this period, the swelling attained its greatest extent; it had a red and inflamed appearance, and was fully as large as a goose's egg; the pulsation was also now the strongest. The whole of the thigh was extremely painful, and a distressing coldness was experienced in that part, on which account it was often rubbed with flannel. During this period, he observed a low diet, and his treatment by Mr. Prohfs was antiphlogistic, but without the loss of blood.

After he had remained a week quietly in bed, the pain decreased, and the pulsation in the swelling lessened. He now put on the compressorium again, without experiencing much inconvenience from it; he still continued in bed. The size of the aneurism now decreased, the swelling of the thigh and the pain therein became less and less, so

that the patient was enabled again to go with the help of a stick. The amendment was now uninterrupted, until the month of June, 1817, when no further pulsation could be perceived in the inguinal region. The swelling of the thigh and the pains in it had also disappeared totally. The compressorium was now no longer used.

When I saw the patient in the end of September, I could not detect the slightest pulsation in the inguinal region. I conclude that the femoral artery must have been obliterated. The whole thigh was rather thin, and a little œdematous swelling was still to be perceived. When the patient walks much, he feels still a weariness in the whole of the leg; in other respects he finds himself so well, that he intends soon to serve again as a sailor.

It is hardly necessary to add, that I do not communicate this case in order to depreciate the use of the ligature in inguinal aneurism. The operation has been performed, not only by many English, but also by some American surgeons, with such decisive and favourable results, that compression cannot be put in competition with it, as Mr. Hodgson*, in his classical work, and Mr. Travers†, in his instructive paper, have clearly shewn.

* A Treatise on the Diseases of Arteries and Veins, containing the Pathology and Treatment of Aneurisms and wounded Arteries. London, 1815.

† Medico-Chirurgical Transactions, Vol. VI. p. 632 *et seq.*

Some fortunate cases, however, particularly of femoral and inguinal aneurisms, shew us that compression is not to be entirely rejected, particularly as patients are sometimes met with, who will not submit to the operation.

It remains to be inquired, whether the compression effected the cure in this case, or whether it ought to be considered as an example of spontaneous recovery? since here, as in the cases of spontaneous cure mentioned by Mr. Crampton*, an augmentation of bulk took place, in consequence of the aneurismal coverings having been attacked by inflammation, before the swelling began to subside.

For a merchant of this place, now deceased, who suffered by an aneurism of the brachial artery, and who would not submit to the ligature, I could effect no cure, notwithstanding compression was continued for six years; but the aneurism did not augment in size during its application. This patient, who had long suffered under angina pectoris, died suddenly at dinner without the smallest preceding attack of suffocation.

* Medico-Chirurgical Transactions, Vol. VII. Part ii. p. 341 *et seq.*

CASE
OF
CYNANCHE LARYNGEA.

BY DR. ARNOLD,

OF STAMFORD.

COMMUNICATED

BY DR. BAILLIE.

Read Dec. 9, 1817.

MR. BOUGHTON, farmer, of Cliffe, a village about eight miles from this place, was at a wood-sale on Thursday, January 16, 1817, where he supposes himself to have caught cold. He was, however, so well as to go to Stamford market the following day (Friday the 17th.) He returned home and drank tea with his family. After tea he called upon and spent some hours with a neighbour, with whom he took some rum and water. Upon returning to his own house he ate some meat supper with his family, and drank after it some warmed ale. In the night he complained of feeling rather sore in the throat. This feeling of soreness in the throat increased during the follow-

ing day (Saturday the 18th), and about 3 o'clock in the afternoon of that day he first saw his apothecary, who ordered him the common remedies for a slight sore throat. About 9 o'clock that evening, when gargling, he first felt an inability to swallow; in his efforts to do which, and to continue to gargle, he was seized with a severe spasm of the muscles of deglutition, and this was immediately followed by a similar spasm of the chest; and such a distressing sense of suffocation was produced, that he seemed to be threatened with instant death, called for the window to be opened, and at length went into the yard, where he leaned in the greatest agony over some paling, expecting every moment to breathe his last.

This paroxysm, which was most alarming to himself and the by-standers, continued with the utmost violence for full two hours. About ten ounces of blood were taken away by the apothecary, and the paroxysm at length subsided. A messenger was immediately dispatched for me, and I arrived at his house about one o'clock in the morning, (Sunday, Jan. 19th.)

I found him sitting up. He complained of sore throat, and said that he could not swallow any thing, as (to use his own expression) "his throat was stopped up." Upon inspection, there was no appearance of inflammation or tumor of the tonsils, uvula, or velum pendulum palati: the ap-

pearance of the fauces was quite natural. I endeavoured to depress the root of the tongue, and at the same time to pull it forward, so as to get a sight, if possible, of the epiglottis : but he could not bear the least pressure there, and said that the spoon touched the diseased part, which was exquisitely painful, and which appeared to him (to use his own expression) to be "pulling out" in the attempt that I was making to examine it.

His voice was very hoarse, but little louder than a whisper ; and he was constantly spitting up a tough gelatinous mucus. His pulse was about 110, of moderate strength, and his skin rather hot.

When asked where he felt pain, he pointed to the situation of the thyroid cartilage ; said that his throat was stopped up there, and that he should never swallow again. Upon inspecting the blood that had been drawn at 9 o'clock, I found it one moderately firm coagulum, without any buffy coat, or any separation into serum and crassamentum.

A small quantity of fluid was now given him to swallow, but it was forcibly rejected through the nostrils ; and the effort to effect deglutition produced a violent spasm, which was followed by sickness, and the vomiting of green bile.

Being convinced from a consideration of all the symptoms, that I had a very serious case of *Cynanche Laryngea* to deal with, and that consequently no time was to be lost, I directed that the patient should be bled immediately in my presence. When about twenty ounces of blood had been taken away, there was a strong tendency to delirium, and I ordered the arm to be bound up. When he had a little recovered, I inquired about the pain of the throat, which he said was much abated. Thinking this a very favourable opportunity for him again to try to swallow, and being anxious to get down a dose of submuriate of mercury as quickly as possible, I got ten grains of this medicine mixed up in a small quantity of the juice of preserved damascenes. I desired him to put it very quietly into his mouth, to let it remain there, and, without making any violent effort to swallow it, to wait and see if he could not catch an opportunity of doing so without any straining. After he had retained it some few minutes in his mouth, I encouraged him to try cautiously if he could not swallow it. He did so, and got down a part; and upon a second attempt the remainder; but not without inducing a paroxysm of the dyspnoea, and sense of suffocation, followed by nausea, and a sensation of the medicine being still sticking in his throat.

Encouraged by this result, so far favourable, I directed a purgative enema to be immediately in-

jected, with the view of relieving a distressing sense of fulness which he felt in the lower bowels; and at the same time I ordered the calomel to be repeated every four hours in ten grain doses.

Before I left him, the throat was again beginning to feel very sore, and he to complain that it would be stopped up, and that he should never swallow again. His pulse was now very feeble; and considering how rapidly the symptoms of debility had come on in similar attacks, I was afraid that another bleeding from the arm would not be borne. I therefore desired that leeches might be procured as quickly as possible; and that immediately upon their arrival, at least a dozen should be applied to the upper part of the trachea; afterwards a blister to the sternum; and that a second purgative glyster should be thrown up in the course of four or five hours, unless the calomel should previously have acted upon his bowels.

It was about 3 o'clock in the morning when I left him; and upon my arrival at his house again about 11 o'clock the same morning, the following was his state: he complained of less pain of the throat, and though he said he could not swallow, he had got down another calomel powder, but with great difficulty. The glysters had brought away some fæces, but there had been no purgative action; thirteen leeches had been applied, and the orifices were still bleeding; he spoke

with less hoarseness, and his pulse had got down to 100.

As it was now his time to take a third powder, I was happy to witness his being able to do so with some degree of comparative facility, though not without many efforts, and the induction of the sense of suffocation to some extent. He complained that he felt almost as weak from the loss of blood from the leeches, as he had done from the venæ-section.

I left him at this visit with some small degree of hope ; and as I now placed my reliance chiefly upon the calomel, the specific effect of which upon the salivary glands I wished to excite as speedily as possible, I directed it still to be continued in ten grain doses at intervals of four hours ; and also that the leeches should again be applied in the evening, if there was any increase of pain, or if indeed there was not a still further abatement of it.

Monday, Jan. 20th. Upon my visit this morning, it gave me great satisfaction to find my patient swallowing some tea with a degree of comfort. His throat was much easier than the day before, though still in pain. The calomel had acted upon his bowels, and brought away a great deal of foetid dark green bile. There was a tendency to ptyalism, and he complained much of

his gums feeling tender. An equable warmth was diffused over the surface of his body; the appearance of his countenance was good; the pulse about 110, of moderate strength; and the tongue slightly coated. I directed saline draughts, with a small quantity of liquor antim. tartariz.; thin milk porridge or tea for his diet; and that a dose of jalap should be given early the next morning, and be repeated if necessary: also that leeches should be again applied to the upper part of the throat; and that if the pain continued, they should be a second time used previously to my next visit, which was not to take place till after an interval of a day, unless a recurrence of unfavourable symptoms should make it necessary to send for me sooner. The calomel was to be discontinued.

Wednesday, Jan. 22d. I now found my patient quite convalescent. A considerable ptyalism had obtained for the last two days. All pain was removed; the power of swallowing was recovered; the voice was natural; and all his feelings comfortable: and from this time he had no return of any unpleasant symptoms, but gradually recovered a state of better health than he had enjoyed for some time before this serious attack.

Stamford, Oct. 25th, 1817.

SOME OBSERVATIONS
ON THE
CURE
OF
HYDROCELE
OF THE
TUNICA VAGINALIS TESTIS,
WITHOUT PROCURING
AN OBLITERATION OF THE SAC.

By KINDER WOOD, Esq.

**MEMBER OF THE ROYAL COLLEGE OF SURGEONS, AND SURGEON
IN OLDHAM.**

Read Dec. 9, 1817.

I AM desirous of offering the following cases of Hydrocele of the Tunica Vaginalis Testis to the Society, because the cures were remarkably easy and expeditious to the patient, and effected by a slight extension of the palliative operation or simple puncture ; and also because this successful result was procured without inducing an adhesion of the tunics and obliteration of the cavity of the sac. I trust there are many cases where the same operation will be equally successful, and I have

therefore taken the liberty of adding such remarks as a consideration of the subject has suggested, which I hope will not be deemed too tedious an intrusion upon the time of the Society.

CASE I.

I was desired to examine a tumor of the scrotum, by a man who had been affected with the disease sixteen years. It had appeared after an injury of the parts, and had always been thought a rupture. He was of an healthy and robust habit, fifty years of age. I found the disease to be a Hydrocele of the Tunica Vaginalis Testis of the left side. The tumor was opened with a broad shouldered lancet, in the customary situation, the lancet in consequence of its figure making a larger incision into the external covering than into the Tunica Vaginalis; fourteen ounces of clear water were evacuated through the opening; when the Tunica Vaginalis was emptied of its contents, and a small part presenting at the internal opening; this was slightly hooked with a small dissecting hook, and a portion so brought forward through the internal incision, as to enable me to cut it away with a pair of fine scissors. The puncture was then closed and supported with adhesive plaster; the parts were put into a bag truss, and the

patient. enjoined rest and a recumbent position. The day after the evacuation the patient was walking about the house upon my visit; there was a little tenderness and tension of the scrotum upon examining, but no pain in the loins or fever. The third day the scrotum was much the same; the plaisters were removed and fresh ones applied, as they did not lie comfortably. On the fourth and fifth day the man walked up to my house, and from this time the tenderness and tension of the parts gradually subsided; the incision healed in an ordinary time by the first intention, and the result was a complete cure in less than a fortnight, so that the man returned to his customary employment.

In this case it is evident, that the consequence of removing a small portion of the Tunica Vaginalis Testis, was only a gentle and favourable inflammation of that membrane, the mildness of which was doubtless to be attributed to the endeavour of healing the external opening by the first intention. I have frequent opportunities of seeing this patient, and as the inflammation was so very mild, it always appeared to me that the cure was effected without any obliteration of the cavity of the sac. On the 20th of July, 1817, I examined the part, several years after the operation; it was rather fuller than the opposite side of the scrotum, but perfectly cured, and the testicle

manifestly unconnected with the Tunica Vaginalis.

CASE II.

I opened a Hydrocele of an elderly healthy man, which had appeared without any ascribable cause six months previous; eight ounces of a clear transparent fluid were evacuated, a small portion of the Tunica Vaginalis Testis was cut away, as before stated, and the external opening healed by the first intention in little more than a week. On the second day the scrotum was tender, and a little enlarged, which gradually subsided from the fifth day without the use of any external or internal means, except being supported in a bag truss. No effusion has since taken place. I lately examined the part, and could find no trace of the existence of a previous disease, except the remains of the puncture, which was very slight and scarcely perceptible; and as several years have elapsed, there can be no expectation of a return of the affection. But my attention was chiefly turned to an examination of the natural connections of the parts, with a view of confirming my notes of the case; and I can have no hesitation in asserting, that no union has taken place betwixt the Tunica Vaginalis and the Tunica Albuginea Testis.

CASE III.

Mr. R. consulted me about an enlargement of the left side of the scrotum; four years previously he had hurt the part against the saddle when hunting. The enlargement commenced in a short time afterwards: it was not very large; attended with numbness of the thigh and sense of weight in the loins; it was of a pyramidal shape and transparent. The disease being evidently Hydrocele, a puncture was proposed, to which the patient was extremely averse; the disease however enlarged, and he submitted. About five ounces of water were evacuated through a puncture with a broad shouldered lancet, a portion of the Tunica Vaginalis was brought forward and cut away with scissors; the external opening was accurately closed, held together with adhesive plaister, and supported in a bag truss; in the afternoon the patient walked about his house, giving directions to some workmen without any inconvenience. Upon the second day I visited him, and found that he regularly walked about his house and garden, without sustaining any particular inconvenience, having kept the part supported. The scrotum was slightly tumefied and rather tender to the touch, but there was no pain in the loins or fever. On the fourth day he walked to my house about a mile; the plaister was removed and another applied; the scrotum was still rather full and tender,

but these symptoms gradually subsided, and in less than a fortnight the part was quite well. In this case also, the cure was completed without an abolition of the cavity, and a sufficient time has elapsed to decide upon its certainty.

It is easy by careful examination to ascertain, whether or not the cure of Hydrocele has taken place without abolishing the cavity of the sac. Upon the day I examined the scrotum in the second case, I also examined a scrotum where cure was effected by the abolition of the cavity. In this latter case the testicle was rather harder, larger, and less moveable beneath the external covering, and this may be expected, since the union of the two tunics necessarily diminishes the mobility of this organ, and gives a sensation as if the testicle rolled immediately under the scrotum, having no greater space of motion than is allowed by the looseness of the cellular membrane. The contrary is the case when the cure is completed without obliterating the cavity, the testicle retaining all that looseness and mobility which it possesses in a state of nature.

In these cases no such effusion took place as that recorded by Mr. Ramsden, as immediately succeeding the quantity of stimulus he gave to the inner surface of the sac; the effect of cutting away a small portion of the Tunica Vaginalis, and healing the opening in the scrotum by the first in-

tention is evidently inflammation of that membrane, unaccompanied by any effusion of fluid, or inflammation of the testicle: in the three cases above related, the inflammation was also unusually mild, and not succeeded by any obliteration of the sac.

There is not any opinion in the practice of surgery, which has had so unlimited an acquiescence, as that the cure of Hydrocele requires a complete obliteration of the cavity containing the fluid. Douglas first seems to have had some doubts upon this, but rather insinuates than affirms the doubt, by considering an union as very improbable in those cases where the sac is old, thick, and indurated. From the universality of this opinion it has necessarily followed, that all operations proposed for the radical cure, are founded upon a presumption of the necessity of this obliteration; the cases of Mr. Ramsden, however, prove that this is matter of assumption only, and not of fact, and there are other observations which shew how unfounded has been the opinion which has had so unanimous a concurrence. When Hydrocele is dispersed by the use of dissentient applications, which has happened occasionally in adults, and which I have frequently seen in children; and when the fluid is absorbed from other causes, of which Mr. Pott gives two cases, undoubtedly the cavity of the Tunica Vaginalis Testis undergoes no process of abolition: but what has most fre-

quently happened, and the process of which has excited little inquiry, is that recovery which occasionally succeeds to simple puncture and the evacuation of the fluid.

Mr. Elsa was of opinion that the simple puncture was more successful formerly than at present, owing to the puncture being made larger; if this were really the case, it would be desirable to return to such a practice, for to cure by one mild operation, is better than to cure by two mild operations; and it is laid down by Sir James Earle in his excellent work, that previous to attempting a radical cure, the palliative operation should always be performed once. But the cause of cure after puncture will not be found in the size of the incision. Mr. Pott, to whom this operation is under so great obligation, has pointed out the cause of cure, though I think he has not drawn such an inference as the premises warrant. "If the opening in the Tunica Vaginalis was small and united again immediately, the bag always filled again with water, and the disease recurred." So says that admirable writer: and again he remarks, "If the orifice instead of immediately uniting became inflamed or sloughy, such an adhesion of the coat to the albuginea testis sometimes followed, as caused an abolition of the cavity, and consequently a radical cure." Warner has a case very much in point: a puncture was made with a lancet, and a tent introduced through the opening; a discharge

came on on the fourth day, followed by an abscess, which being opened healed in a few days. I presume that such a rapid healing of the abscess could not possibly have taken place, had there been any collection within the cavity of the Tunica Vaginalis Testis; such a collection of pus healing thus could only have been situated in the cellular membrane of the scrotum. What then is the inference we would draw, but that when the opening heals by the first intention, we fail in producing a cure; and that when the opening does not heal by the first intention, a cure very frequently follows, not indeed in the greater part of cases by the abolition of the cavity, but because the inflammation of the sac thus excited rouses and stimulates the exhalant vessels to a more vigorous and healthy action, thus overcoming that relaxed and atonic state of them which is the cause of the accumulation.

Whatever may be the remote causes of Hydrocele, the proximate cause will not be found in diminished action of the absorbent vessels; of this Sir James Earle's 25th Case is a proof: a small incision was made into a Hydrocele immediately after a bruise, when a fluid, of which the major part was blood, issued out; the bag was not emptied, but closed and healed. A short time after the tumor was again opened, and the fluid discharged was of a pellucid straw colour. Upon this case the author remarks, that the absorbents

on the surface of the membranes appear to have had the power of separating the red globules and absorbing them ; whether this follows as a consequence I do not inquire ; enough is proved for the present purpose, that the absorbents, so far from being tardy or inert in their functions ; were in a state of considerable activity ; and we are reduced to explain the phenomena of the disease upon the grounds of an increased secretion only. Whether the accumulation of the fluid be the consequence of an increased activity of the vessels, as is Mr. Ramsden's opinion, or of a relaxed and debilitated state of them, may be difficult to decide ; but from the total absence of all symptoms denoting increased action, and since a cure does frequently follow the application of a stimulus to the sac, it would appear that the proximate cause of the effusion consists in a relaxed and debilitated state of the exhalant vessels of the part.

If these opinions are correct, it would appear that a stimulus to the vessels of the part, and not an union of the two membranes, is the natural cure ; for who would prefer abolishing a cavity which doubtless has its uses so far as regards the functions of the testicle, rather than to effect a cure by stimulating diseased vessels to a sound healthy action. The inducing a certain degree of inflammation, has the effect of stimulating these vessels and superseding the diseased state of them, as Mr. Ramsden's cases prove. Nor is the part

regular in this respect: many chronic affections are cured by increasing the actions of the vessels, particularly that chronic ophthalmia which consists in relaxation and debility of the blood-vessels in the neighbourhood of the eye. What then have we to do but to stimulate and excite these vessels in the most natural manner?

It is well known that when a puncture is made in any uncommunicated cavity, if union by the first intention does not take place, the consequence is an inflammation from the puncture along the membrane lining the cavity; such takes place with an amazing rapidity in cases of puncture of the peritoneum, pleura, and in the membranes lining the large joints; and such an inflammation also takes place in the membranous bag containing the water of Hydrocele under the same circumstances. It is this inflammation ensuing upon a want of union, which is the most frequent cause of the cure of this disease, when such cure takes place after the simple puncture. Undoubtedly, in some cases where the Tunica Vaginalis and the Albuginea Testis are very much irritated during the evacuation, either by too much handling or other circumstances, these tender and delicate membranes will inflame too highly, and suppurate or slough, and thus produce a cure of which there are many cases in authors; but in the majority of cases of cure under these circumstances, it is effected as in the cases related in

the commencement of this paper, by a slight and mild inflammation of the Tunica Vaginalis Testis alone. The object then will become that of preventing the opening in the Tunica Vaginalis from healing by the first intention, and also to do this in such a manner as to avoid the danger of supuration and sloughing; for this purpose, since it is advisable that the palliative operation should always be performed once previous to attempting the usual means for a radical cure, I would recommend a slight extension of it as in the cases above related, viz. to bring gently forward by means of a small hook that portion of the Tunica Vaginalis presenting at the external opening, and to cut away the portion thus hooked with a pair of scissors, afterwards closing the external opening with adhesive plaister. By which means a moderate inflammation of the membrane will be ensured, and I am led to hope the success will be frequent.

In the three cases related, the sac was not much thickened, a material circumstance to notice, because in old and very large Hydroceles, and where the sac is much thickened and indurated, a stimulus much greater than the means here proposed will produce is required, and hence it will be necessary to guard against disappointment, by putting the proposed plan in execution only where there is a probability of success, which

is in moderate sized cases, not too old, and where the sac is not too much thickened and indurated.

The following case is subjoined, because the plan was put in execution under the most unfavourable circumstances of bad health, and it shews that although the symptoms ran high, they were not so troublesome as those which would have succeeded any other operation, nor indeed does it appear that any other mode would in this case have been admissible at all.

A man about forty-five years of age had been under my care some time for affections of the chest, attended with cough, large mucous expectoration and dyspnoea; his countenance was very sallow; he was low-spirited, and could not sit much up, when he shewed me a Hydrocele of the left side of the scrotum. As I was very averse to the making an opening, he was advised to suspend the part and wait patiently. Understanding, however, that the collection was watery, he became resolute to have it discharged, and in compliance with his earnest request more than my own inclination, a puncture was made with a lancet; betwixt \bar{z} ij and \bar{z} iv of straw-coloured fluid evacuated, and a small portion of the Tunica Vaginalis cut away. This was succeeded by an inflammation of the substance of the testicle itself: he was advised to support the part and keep a recumbent

position, which he did for three weeks; the inflammation of the testicle was very violent and painful during its continuance, and yielded slowly to the ordinary treatment. After the pain was gone, it continued obstinately enlarged and hard many months, so as to require a constant suspension. In this state he returned to his customary occupation, and the tumefaction gradually subsided. During the confinement, and the violence of the affection of the testicle, the irritation of the chest gradually subsided and disappeared, and I was very much induced from its previous obstinacy to conclude, that this affection of the testicle had a powerful effect in superseding the troublesome and formidable disease in the breast. In the beginning of August, eighteen months after the puncture, I examined the testicle, and found it a little larger than the opposite one, but no other perceptible difference from nature, excepting an evident adhesion of the Tunica Vaginalis to the Tunica Albuginea.

CASE
OF
HEREDITARY ICHTHYOSIS.

By P. J. MARTIN, Esq.

OF PULBOROUGH, IN SUSSEX.

COMMUNICATED

By MR. CLINE.

Read Jan. 20, 1818.

THE following cases are offered to the notice of the Medical and Chirurgical Society as more perfect and interesting specimens of Ichthyosis than are often seen. More curious also; as a confirmation of the hereditary tendency of the disease, and as counterparts to the cases of Edward Lambert and his children, extracted by Dr. Willan from the 49th Volume of the Philosophical Transactions.

Jane Holden, of whom a portrait is annexed, (see Plate I.) aged three years, is the only child of a husbandry labourer. Her whole skin, except the face, is covered with small scales, or rather

warty or bristlelike projections, varying in colour from the lightest brown to the deepest black, and in some parts having a yellowish tint, as if scorched by the fire. They vary in size and form in different parts of the body, but are mostly long and flat, and standing at right angles to the skin, except where by the pressure of the clothes, they are made to assume an imbricate disposition. They are easily removed when they grow long, and are in that way constantly being exfoliated and renewed in all parts of the body.

The child seems to suffer no uneasiness from this extraordinary state of the cuticle, but a slight occasional itching, and is in other respects strong and healthy, except being liable to trifling boils about the head and neck, and now and then a slight psorophthalmy.

The disease began to make its appearance, without any previous or concomitant constitutional disorder, when it was three months old, beginning about the joints and upon the soles of the feet. It commenced in the mother also about the same age.

She was the offspring of healthy parents, and one of six children, none of whom but herself have any cutaneous disease. Her cuticle is nearly in the same state as the child's, except upon her neck and bosom and forearms, where it is natural.

Her fingers and palms are covered with a close brown coat, more like bark than scales, which very much impedes their motion ; and the soles of her feet are in the same state. Her legs are completely incased in thick scales, and at a distance might be mistaken for those of a negro. Upon the parts most liable to friction, the scales are short and of a shining black ; upon the legs they are broad and close, and upon the insteps like black lumps, or warts.

The child inherits the features of the father, who is a fine and handsome man ; and there is no mental incapacity either in it or its mother, although the countenance of the latter is rather fatuous, and certainly very revolting. It may be worthy of remark too, that their teeth are in a state of great decay. The child has cut all its milk teeth, and they are all carious.

The inside of the elbow of the mother has been chosen for delineation, as presenting the best appearance of the manner in which the scaliness is gradually lost in the sound integument. (See Plate II.) In this respect it differs from the drawings of Bateman and Willan, where the scaliness appears to terminate abruptly, more like the leprous patch.

Cases like these are subjects of record rather as matters of curiosity than of practical utility, or

as affording any useful physiological deduction. Unless we are to infer, that such appearances are to be classed along with many other incurable disorders, not as diseases, but as natural and inherent *labes* in the constitution, which, like other deviations from the common course of nature, (depending upon superabundant or defective organization,) hereditary defects in man, varieties, good or bad, in animals and vegetables, arise accidentally, and are gradually worn out again, or suddenly lost, like a particular kind of apple, or the supernumerary claw of a fowl's foot, by the extinction of the race.

Pulborough, Sussex, Nov. 17, 1817.

EXPERIMENTS
ON THE
TRANSFUSION OF BLOOD
BY THE
SYRINGE.

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COMMUNICATED
By MR. CLINE.

Read Feb. 3, 1818.

A FEW months ago I was requested to visit a woman who was sinking under uterine hemorrhagy. The discharge had stopped before my arrival, but her fate was decided, and notwithstanding every exertion of the medical attendants, she died in the course of two hours.

Reflecting afterwards on this melancholy scene, for there were circumstances which gave it a peculiar interest, I could not forbear considering, that the patient might very probably have been saved by transfusion; and that, although there was little

opportunity for operating in the usual manner, the vessels might have been replenished by means of the syringe with facility and promptitude. As it seemed doubtful, however, whether the blood would remain fit for the animal functions after its passage through the instrument, the following experiments were instituted with a view to ascertain the point ; and they are now submitted, with all their imperfections, to the consideration of the Society, under the hope, that they may contribute a little to excite the attention of the medical philosopher, and recommend a neglected operation to the experimental investigation which it seems to deserve.

The femoral* vessels of the dog were laid bare *at the groin* ; and a pipe, sufficiently large to fill the artery, was introduced with its extremity toward the heart. On removing the ligature, which had been thrown around the vessel to prevent a premature discharge, the blood rushed out with such impetuosity, that eight ounces escaped in the course of two minutes, and the discharge soon afterwards ceased. From this discharge of blood, the most alarming symptoms arose ; distress and gasping, struggling and convulsions, and at length a profound fainting, marked by stoppage of the circulation, by in-

* Register, Experiment 2.

sensibility, and by a complete relaxation of the abdominal muscles.

In this condition the animal was suffered to lie for a few seconds, when six ounces of blood taken from the artery of another dog, were injected into the femoral vein, in a manner which will be hereafter described. In consequence of this operation, it soon revived; the abdominal muscles became firm, and the respiration regular, sensibility was restored, and the blood again circulated, indeed so briskly, that it pushed away the concretion which had formed in the femoral tube, and rushed out. So sudden and complete was the resuscitation, that the animal seemed rather to awake from sleep, than arise from apparent death.

To give this experiment (which will be found in the annexed register, together with various repetitions,) all its force, it may be proper to observe, that the combination of symptoms just enumerated is mortal, and that whatever the symptoms be, the dog invariably dies, when left to its natural resources, if the blood is suffered, as in this instance, to flow from the femoral tube, until the discharge spontaneously ceases. Transfusion alone can save it.

From facts like these it is evident, that the transmission of blood through the syringe, does not un-

fit it for the animal purposes ; but as this is a principle, which lies at the bottom of the whole operation, it may be proper to confirm it by the following experiments.

The femoral * vessels of the dog were laid bare as before ; and a pipe was introduced into the artery and vein. Then, by means of the syringe, which will be hereafter described, the blood which was suffered to flow into a cup from the artery, was directly returned into the vein ; and this operation was continued, not for a few seconds only, but for twenty-four minutes. Yet the dog sustained but little injury.

It should be observed here, that if the blood be suffered to flow in a full stream from the femoral artery of a dog below the middle size, about half a pint will be discharged in the course of two minutes ; but as this operation was carried on for twenty-four, and the artery gave off its blood impetuously during the whole time, it follows, that twelve pints of blood must have entered the cup, and been transmitted by the syringe to the veins. The whole weight of the dog, however, did not equal twelve pounds, and hence it is obvious, that the same blood must have passed the syringe repeatedly ; a conclusion which is confirmed by

* Register, Experiment 6.

the highly arterial characteristics, which the blood had acquired, when the operation terminated. This experiment will be found, together with repetitions, in the appendix; and proves, like the former, perhaps in a still more impressive manner, that blood may be transmitted through the syringe, and this too repeatedly, without becoming unfit for the purposes of life.

From this principle it may be inferred, that the transfusion of human blood by the syringe to the veins of a human subject, may be attended with the most important advantages; but as accidents may occur in attempting the operation, it is necessary to ascertain how far they will affect its success.

Although the blood sustains but little injury when discharged into the cup and promptly transferred to the veins, it seems to suffer in some way or other if the transfusion be delayed.

A dog* was drained by the femoral artery, and replenished by the vein; but in performing this experiment, the human blood was injected instead of the canine, and it was suffered to be in the cup between fifty and sixty seconds before it was thrown in. The animal expired on the table.

* Register, Experiment 8.

At first indeed it revived, the blood circulated, the respiration was renewed, and sensibility was restored ; but these flattering symptoms were of short duration, and in the course of a few minutes it died.

In a second* experiment, conducted in the same manner, but with this difference, that the blood remained in the cup for thirty seconds only instead of sixty, the resuscitation was complete, as the animal, though languid, was able to walk, and became so lively and sensible, that it took a pleasure in being caressed. Yet it died in the course of twelve hours.

From a cursory survey of these and similar experiments, it appears that the blood, by lying in the cup between thirty and sixty seconds, is rendered unfit for the purposes of life. Although, however, on a first view they appear conclusive, they are in reality liable to some strong objections, arising out of a principle which I shall next endeavour to elucidate.

It has been very generally asserted, that the blood of one kind of animals may be substituted with impunity for that of another ; and that the dog, for instance, would suffer but little inconve-

* Register, Experiment 7.

nience, if it were drained of its own blood and replenished from the sheep. This principle, however, which is now seldom controverted, is rendered extremely doubtful by the following experiments.

Three* dogs were drained of their own, and supplied with human blood, in the manner already described; only the injection was performed without delay; for the blood was taken up by the syringe while flowing into the cup, and injected into the vein immediately. Yet all these dogs, although they recovered for a time, died, one of them in a few minutes, another in a few hours, and a third several days afterwards. The last, indeed, appeared for a time likely to recover, but it died with a dropsy of the pericardium. It is proper however to add, that another dog, on which a similar operation had been performed by Mr. Goodridge of Barbadoes, a gentleman who was at that time finishing his studies at the united hospitals, eventually recovered. The truth is, the constitution of this animal was so vigorous that it resisted the shock; and yet, for a few hours after the operation, a variety of unfavourable symptoms occurred. This experiment, therefore, is in reality in unison with my own; for it is not contended that the exchange of blood *necessarily destroys*

* See Register.

life, but merely that it *may sometimes endanger* it.

These experiments acquire additional strength, when associated with others instituted by Dr. Leacock (also of Barbadoes) a few months before; experiments to which I was wholly indebted for my first notions upon this subject. From these it appears, that if a dog is drained of its blood *until apparent death is produced*, it may indeed be revived for a time, and very completely too, by replenishing it from the sheep; but it generally dies in a few days afterwards.

Connected with my own, these experiments of Dr. Leacock possess a peculiar interest; for although they harmonize with them in the general result, they differ materially in their circumstances. It was arterial and not venous blood; the blood of the sheep, and not the human that was substituted; and it deserves *particular notice, that the transfusion was not performed by the syringe*, a method of operating with which he was unacquainted, but simply by the tube.

In considering what has just been advanced, two reflections occur to the mind: first, that transfusion by the syringe powerfully recommends itself, as it enables the operator to inject human blood into human veins; and secondly, that it invalidates the experiments already related, which seemed

to prove, that the delay of the blood in the cup renders it unfit for the animal purposes. These were performed with the human blood ; and it is obviously difficult to determine, whether death must be attributed to the delay in the cup, or to the substitution of the human blood for canine. Nor in operating on the dog can this objection be avoided ; for its own blood coagulates so rapidly, that it cannot be employed. The subject deserves further investigation.

In transfusing human blood by means of the syringe, it is obviously the venous and not the arterial blood that must be injected ; for although it would be easy to induce an attendant to submit to the common operation of bleeding, there are few perhaps but would object to the opening of an artery, even the temporal itself. It is of importance, therefore, to remark, that the venous blood seems to revive an animal, as well as the arterial.

A dog* was drained of its blood by the femoral artery till apparent death was produced ; a fresh supply was then injected in the usual manner by the vein. In performing this experiment, however, venous blood was substituted for the arterial ; yet the animal recovered, nearly in the same manner as if arterial blood had been transfused. This

* Register, Experiment 12.

experiment was the more decisive, as the dog was suffered to lie for a few seconds in a state of apparent death before transfusion was attempted.

In transfusing blood by the syringe, there is a risk lest air should be introduced. To ascertain whether this accident would occasion death, five* drams of atmospherical air were injected into the femoral vein of a healthy dog, which was scarcely larger in the body than a full sized cat, in quantities of a dram at a time: but the animal suffered very little injury. It is true, indeed, that deep sighing recurred during the operation, that the pulse became very irregular, and the muscular system tremulous; but these symptoms are produced independently of experiment, from the mere alarm occasioned by tying the animal to the table. The general health, however, certainly suffered. There was restlessness, vomiting, and a continuance of the muscular tremor; and this, it may be remarked, together with the small size of the animal, rendered it difficult to observe the pulse. On the other hand, however, the restlessness continued for a few hours only, and the vomiting occurred but once; the appetite was little impaired; the animal recovered in three days; and during the whole of this period, no symptom of immediate danger occurred. Yet compared with the small

* Register, Experiment 13.

size of the animal, the quantity of the injection was large.

In a second* experiment upon the same dog, about three drams of air from the lungs were blown into the femoral vein, without even producing much *temporary inconvenience*; so that it seems indisputable, that small quantities of air may enter the vessels without destroying life.

Nor is this principle, which is confirmed by similar experiments of Dr. Haighton and others, materially invalidated by those which have been made upon the horse. For although it be granted that this animal may be killed by blowing air into the veins; this solitary fact can bear with little weight upon the present question, unless the quantity of the air, and the manner of its introduction be also ascertained.

There is little risk in transfusing the human blood by the syringe, lest the operation should be interrupted by concretion; for its coagulation is slow.

Three drams of blood drawn from the femoral artery of a dog, began to concrete in about ten

* Register, Experiment 14.

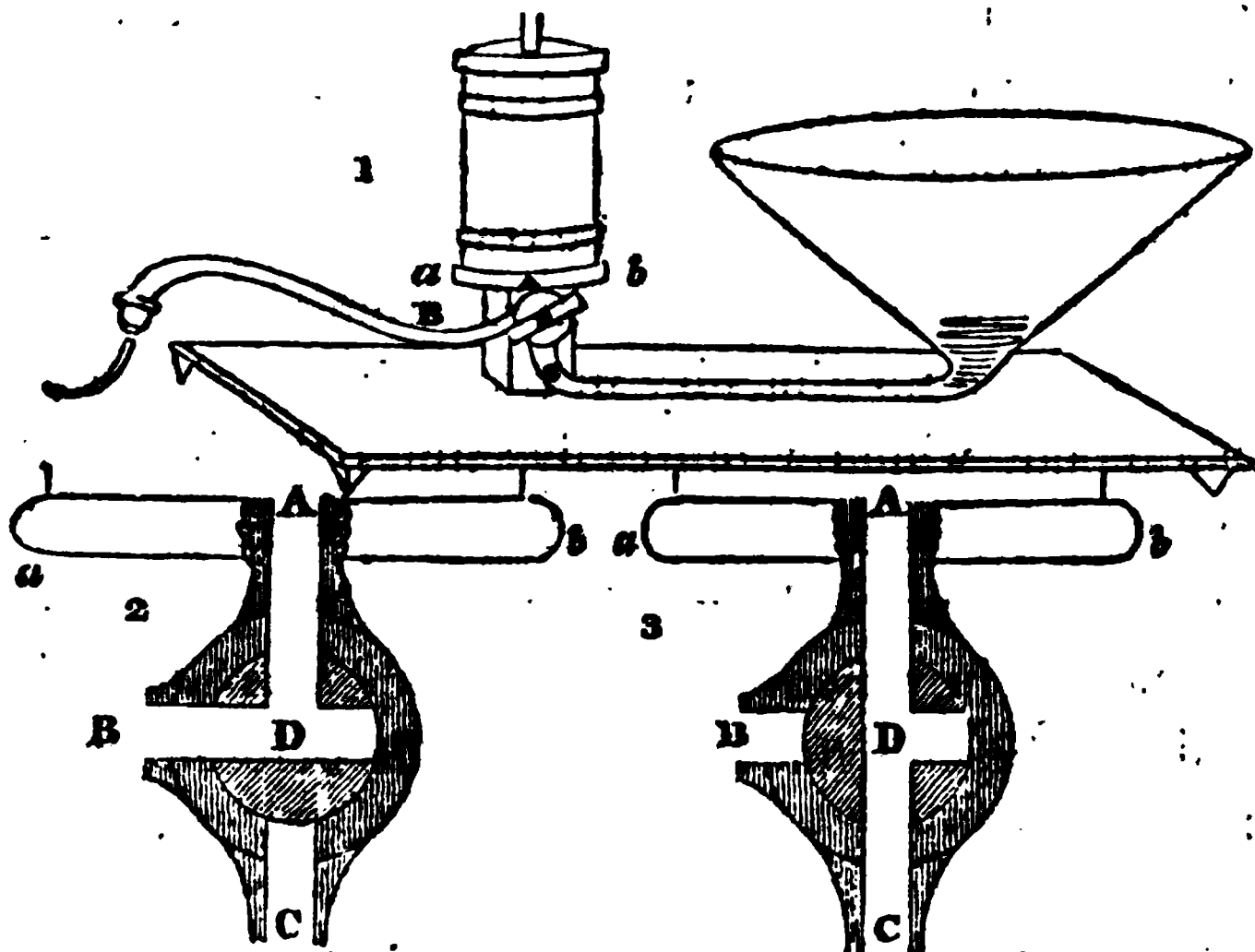
† Register, Experiment 15.

seconds, and had become completely solid in eighty. But an ounce of blood taken from the arm of a girl of an epileptic disposition, but in other respects healthy, did not begin to coagulate distinctly under a minute, and was not completely consolidated in less than six. The blood of the sheep and the ox coagulates more rapidly than the human*. Now if the dog's blood may, as the preceding experiments prove, be transfused by the syringe without material obstruction from concretion, there can be no difficulty in transmitting the human blood, which requires five times the interval for its coagulation. Indeed no obstructions of this nature occurred even in conducting those experiments, in which the human blood was suffered to lie in the cup for several seconds before it was injected.

It may be proper to remark, that in executing these experiments, both water and weak wine were injected with impunity, and the instrument was not warmed.

* See Register.

The apparatus used in these experiments, and which it may now be proper to describe, consists of four different parts: the syringe, the cup, the tubes, and the frame.



(Fig. 1.) Exhibits the syringe, &c.

(Fig. 2. 3.) The structure of the double-way cock.

A a b the head of the syringe.

A D B (Fig. 2.) the channel by which the blood is expelled: while A D C is closed.

A D C (Fig. 3.) the channel by which the blood enters: while A D B is closed.

The change is effected by giving the plug D a quarter-turn.

The syringe is constructed in the usual manner; the cup, which is designed to collect the blood, is funnel-shaped; but the tubular part is a little more complicated. It consists of two pipes, with a double-way cock. Of these pipes, one is intended to discharge the contents of the syringe; and is connected by one extremity to the nozzle, and by the other, when the instrument is in action, to the tubule which is inserted into the vein. To this venous tube it fixes by sliding over the end, so that the two may be easily disunited; but it is connected to the syringe itself by means of a screw upon the side of the nozzle, in such a manner as to lie at right angles with it.

The other pipe, which is designed to conduct the blood from the cup to the syringe, is united at one extremity to the end of the nozzle, and at the other to the bottom of the cup, the point of which opens into it. Of course this pipe is formed with a rectangular curve at either end, so as to give an upright position to the cup.

The two-way cock, which completes the instrument, forms a part of the nozzle; and making a quarter turn, throws open the tube which discharges, and closes that which admits the blood, or the contrary, according to the position in which it is placed.

The whole apparatus is mounted perpendicularly

on an upright post ; and the floor on which this rests is poized with lead, in order that the operation may not be embarrassed by the instability of the instrument. The joints are air-tight.

The syringe, which was made by Laundry, of St. Thomas's Street, Southwark, is of brass. Its capacity, which, however, admits of regulation by means of a check on the piston, is eleven drams ; small, in order that the blood may not be thrown into the vessels too rapidly, nor detained too long ; and of a determinate size, in order that the operator may measure the quantity of the blood which he injects.

In constructing this instrument, the tube which discharges should be made of very pliant leather ; and that which admits the blood, may be formed of the flexible metal used for catheters : the first, to prevent the tube from *wriggling* in the vein during the injection, if the apparatus should move or the animal be restless ; and the last, in order that the situation of the cup may admit of more ready adjustment. For the same reason, the upright post, to which the syringe is to be fixed, although it should not move too easily, may be made to turn round.

Various valvular contrivances might be suggested, to command the orifices of the tubes where they unite with the syringe, and give the proper

course to the fluids it propels. The two-way cock, however, although it is liable to objections, possesses advantages over every other apparatus of this nature, as it is less liable to be clogged with blood or otherwise deranged, and as it may very easily be made air-tight.

The manner of using this instrument, should it be thought proper to operate with it upon the human vessels, may be easily understood. For this purpose, a vein should be opened in the arm or hand of the patient, and a pipe introduced; then, by the common operation of bleeding, blood should be drawn into the cup of the syringe from the arm of an attendant, and injected without hurry or delay.

In performing this injection, the piston should be played with one hand, while the cock is managed with the other; in such a manner as to allow the blood to enter and escape by the respective tubes.

Before the injection commences we must expel the air from the tubes, and ascertain that the apparatus is tight. The air is most conveniently expelled by filling the tubes with water, as the small quantity used for this purpose will produce no inconvenience when injected into the veins.

The tightness of the instrument is essayed, by

putting a few ounces of water into the cup, opening the cock upon the tube of admission, and playing the piston rapidly; for if no bubbling appear, after the air which had lodged in the apparatus has been expelled, it is secure. If the water used in this essay is tepid, it will give a proper temperature to the instrument.

It should be the task of an assistant to take care that the cup never become empty, as air would be drawn in; and this is an accident which the operator himself may prevent, by regulating the injection according to the supply.

On the other hand, however, the blood should never be suffered to accumulate in the cup in too large a quantity. Should it indeed be hereafter ascertained, that the human blood may lie out of the vessels for several seconds, or till it begins to coagulate, without becoming unfit for the animal purposes, it would then perhaps be better, if this instrument were used at all, to draw half a pint of blood into the cup at once, or at least to keep it pretty full; but until this principle is confirmed by *numerous, pointed, and cautious* experiments, such a method of operation would be unjustifiable.

It may be objected to transfusion in every shape, that the tube may excite inflammation of the vein. In weighing this and similar objections, however, it should not be forgotten, that in the present state

of our knowledge, at least, the operation would be justifiable in the most desperate cases only, when it seemed the only mean of saving the life of the patient. There is much good sense in the familiar maxim of Celsus, and in the present case it is peculiarly applicable; for surely it is better to incur the uncertain risk of venous inflammation, than to leave the patient to his fate. Besides, it is not necessary to tie the pipe in the vein; it may be easily secured by the pressure of the finger, or the blood might be injected by an artery.

Although I have described the manner of using this instrument, it is by no means my design particularly to recommend it. Many, perhaps, will think that the common syringe, a little altered in its construction, would perform the operation equally well; and I know that it was successfully employed by Mr. Goodridge in the experiments to which I have already alluded. Indeed, should it clearly appear from future observation, that the entrance of a few bubbles of air into the human veins, or the delay of the blood for a few seconds in the cup or the syringe, does not endanger success; perhaps no reasonable objection could be urged against this instrument, and it strongly recommends itself by its portability and simple structure.

In pointing to some of the advantages which

Belong to transfusion by the syringe, I shall not enter into details. I forbear therefore to enlarge on the facility of the operation, or its uses in physiological research; and shall content myself with touching upon three advantages, which appear the most important.

This operation may be performed with *promptitude*; for the human blood is always at hand, and the instrument may be easily provided, as the danger of uterine hæmorrhages, at least, may frequently be foreseen. Promptitude of operating is no inconsiderable advantage, for the apparent death of hæmorrhagy soon becomes irremediable.

If a dog, drained of its blood, be suffered to lie in a state of asphyxia for a few minutes *only after respiration has ceased*, transfusion itself, aided by the hot bath and artificial respiration, will not revive it. This at least is the general result of the *few* experiments which I have hitherto made; and it proves how speedily the apparent death of hæmorrhagy is converted into the real.

Another advantage which arises out of this method of operating, is the abundance in which the blood may be transfused. A dog below the middle size, (and this variety, perhaps, is the most frequently found about our houses,) generally dies after it has given off from eight to twelve ounces

of blood ; but much larger quantities of *human* blood might be easily obtained from the attendants.

It must be confessed, however, that it is not necessary in cases of hæmorrhagy to throw into the vessels as much blood as they have lost ; a very small supply, although it will not restore the energies of the animal, will preserve its life. This truth, which is in some measure established by the result of the first experiment, is so generally admitted, that it is unnecessary to enlarge upon it ; yet I cannot forbear adding, that it seems to deserve a more minute investigation than it has hitherto received.

But of all the advantages derived from transfusion by the syringe, by far the most important is the opportunity it offers of throwing human blood into human veins. There seems reason for surmising, from facts already related, that the blood of one class of animals cannot be substituted, in large quantities, for that of another with impunity ; and hence it becomes of the utmost importance, that we should be able to supply the human vessels with the human blood. Every other method of transfusion with which I am acquainted, is exposed to this grand objection, that it transfuses the blood of the brute—a defect, from which the operation by the syringe is *exclusively* exempt.

REGISTER OF EXPERIMENTS

On the transfusion of blood from the arteries of one dog to the veins of another by means of the syringe.

I. History.—A tube of the full size of the vessel was inserted into the femoral artery; and about ten ounces of blood were discharged in the course of two minutes. No more could be got away.

After the dog had been suffered to lie in a state of apparent death for a few seconds, two ounces of arterial blood taken from another were thrown by the syringe into the femoral vein, through a pipe introduced for this purpose with its extremity toward the heart.

Symptoms.—The first symptoms produced by the bleeding were distress, struggling, and laborious respiration; and these were soon followed by gasping, extreme relaxation of the abdominal muscles, and apparent death.

The distress is indicated by a peculiar sort of cry.

A few seconds after injection the animal revived; the abdominal muscles became firm, the respiration regular, and the circulation was renewed with such force, that the blood pushed a coagulum from the arterial tube and gushed out.

Observations.—As the dog was small, the quantity of blood drawn away may be regarded as considerable; and it should be observed, that the symptoms enumerated above are, as repeated experiments have proved, invariably followed by death, unless transfusion is performed.

This experiment not only proves, that transmission through the syringe does not unfit the blood for the purposes of life; but shews further, that to obviate the fatality of hæmorrhagy, it is not necessary to inject as much blood as has been lost.

II. *History.*—The blood was suffered in this, as in the preceding experiment, to flow as long as it would from the tube inserted into the femoral artery; and about eight ounces were discharged.

Six ounces were then injected as before, and the dog recovered.

Symptoms.—By this bleeding apparent death was produced, together with a whole assemblage of

precursory symptoms, enumerated in the preceding experiment.

Observations.—This experiment, performed on the same dog as the preceding, is little more than a repetition of it; but a larger quantity of blood was injected.

III. History.—In this experiment the blood was drawn off in the same manner as in the preceding, the following differences excepted. It was drawn from the carotid, and not the femoral artery. It was not drawn at once, but at three different times, a few seconds intervening. The dog was small, scarcely larger in the body than a male cat, so that no more than five ounces of blood could be got away.

After the apparent death had continued for a few moments, the blood of another dog was injected; not, however, till it had lain previously for a few seconds in the cup.

Symptoms.—Apparent death was produced, and preceded by the usual symptoms.

In a very few moments after the injection the dog recovered, and so completely, that he leapt from the table as soon as he was unbound. The pulse, indeed, for a little time after the

operation was intermittent and unequal, but these symptoms are frequently produced by merely tying the animal to the frame.

Observations.—The lively health of this dog immediately after the operation, was strikingly contrasted with the languor of another, which was supplied in the same manner with the *human* blood instead of the *canine*.

It is obvious from these experiments, that blood is not rendered unfit for the animal purposes by passing through the syringe.

Transfusion by the syringe from the arteries to the veins of the same animal.

IV. *History.*—In this experiment, a tube was inserted into the carotid artery and the external jugular vein; and the extremities of both were directed towards the heart. The syringe was then adapted; and the blood, which was suffered to flow into the cup from the artery in a full stream, was directly returned into the vein, in quantities of three or four drams at once. In this manner, about six ounces were transfused, after which the operation was suspended for a few minutes. After this delay, six ounces more blood were passed in

the same manner through the syringe; only the blood was injected with less impetuosity, in quantities not exceeding three drams at a time. After another pause, four ounces more were transfused; so that the aggregate quantity of the blood which passed through the syringe in this experiment was a pint. No air was suffered to enter into the vessels.

Symptoms.—The pulse occasionally intermitted in the first stage of transfusion, but there was no obvious change of temperature.

During the second and third stages, the temperature remained unaltered, and the heart seemed to beat naturally, without labour or intermission.

The dog was rather languid for a few hours after the operation, but recovered without the occurrence of any material symptom.

Observations.—It deserves remark, that in this experiment one pint of blood was passed through the syringe without serious inconvenience, although the loss of half a pint would have destroyed a dog of the same size.

The irregularity of the action of the heart arose, perhaps, in part from the injury the blood sustained in passing the syringe; but principally, as

I suspect, from alarm, and from the manner in which the blood was thrown in; for as this was one of the first essays, the operation was not conducted, at the commencement especially, without a little hurry. It should be observed too, that in the first stage, three or four drachms, at least, were injected at once; and as these were thrown into the jugular vein, they must have passed directly into the right auricle—a cavity, perhaps, scarcely large enough to receive them without inconvenience. Accordingly, toward the close of the experiment, when the blood was injected more equably, and in smaller quantities at once, the action of the heart became more regular.

V. *History*.—This second experiment was executed in the same manner as the former, a few differences excepted: The blood was injected at four different times, instead of three; the injections were continued a greater length of time, and the last was pushed so far, that the blood which issued from the carotid artery, acquired the florid arterial colour in a *very high* degree.

Owing to the imperfection of the apparatus, about a dram of air got into the vein.

Symptoms.—The pulse intermitted, in consequence of agitation, before the transfusion began; but during the operation these intermissions be-

came more frequent, occurring every five or six beats, so that the blood sometimes flowed impetuously, at others sluggishly, from the carotid artery. The respiration, however, on the whole, continued natural; and the temperature of the animal underwent no obvious change. Toward the close of the experiment, the intermissions became less frequent, and in a few minutes after ceased altogether.

The entrance of the air did not occasion any unusual symptoms.

Observations.—The most remarkable symptom occurring in this experiment, which was pushed to a much greater extent than the preceding, was the intermission of the pulse. This must certainly be attributed in part to alarm, for it was observed before the operation commenced; but it seems also to have arisen partly from the unequal and impetuous stream, in which the blood was thrown into the heart. It is obvious, that it cannot be ascribed to the arterial nature of the blood which was injected into the veins, or the changes it suffered in passing the syringe; for although the arterial characters of the blood were heightened as the experiment proceeded, and some of it at least had passed the instrument more than once; these irregularities, instead of increasing, became less and less frequent.

VI. History.—This experiment in the main resembled the preceding, but it was performed on the femoral vessels instead of the cervical, and the blood was injected at three different times.

The first transfusion, was continued eight minutes, during which the blood was suffered to flow in a full stream from the femoral artery, and acquired the arterial characteristics in a high degree: the second was performed half an hour after the former, and continued for the same length of time: the third was carried on for the same period, after a pause of half an hour, and a few small concretions formed on this occasion in the cup.

Symptoms.—Before the transfusion began the pulse was unequal and intermittent, but became regular and distinct as it proceeded. It beat 150 times in the minute, which in this dog was nearly its natural frequency. The respiration was accelerated during the operation, and the dog occasionally complained a little; but its temperature remained unaltered, and the animal ultimately sustained but little injury.

Observations.—The regularity of the pulse during this operation is very remarkable, especially if we consider its great irregularity in the preceding experiments. It must be recollected, however, that the transfusion was performed in this

instance upon the femoral vessels, which are remote from the heart, and not on those of the neck.

Half a pint of blood flowed from the femoral artery of this dog in about two minutes; consequently about twelve pints must have been discharged in this experiment, and transmitted through the syringe, in twenty-four. The dog itself, however, weighed less than twelve pounds; and hence it is obvious, that the blood in the large arteries must have issued repeatedly, and repeatedly passed the syringe, which accounts for its heightened arterial character.

The formation of concretions deserves notice, as it proves that the blood in this animal remains fit for its peculiar functions, although certain parts have begun to coagulate.

From these experiments it appears, that the blood remains fit for the vital purposes, although it have *repeatedly* passed the syringe. They confirm the former.

Experiments in which the blood was exposed for a short time in the cup.

VII. *History.*—In this experiment pipes were introduced into the femoral vessels, and about ten

ounces of blood were drawn from the artery, but no more could be got away. Immediately afterwards, about ten ounces of human blood were injected by the vein. This blood was taken from the arm, and about two ounces were suffered to accumulate in the cup, and to lie there for thirty seconds before they were injected. No air got into the vessels.

Symptoms.—Apparent death was produced by the bleeding, and the animal revived as usual in consequence of the injection: the pulse beat 120 times in the minute, and did not intermit; the respiration became regular, and the abdominal muscles firm. The extremities and ears felt rather cool; but this symptom is produced occasionally by merely tying the dog to the frame. After the operation, the animal walked, took food, and appeared pleased with caresses; but it died within twelve hours afterwards.

Observations.—The dog on which this experiment was performed was aged, but healthy.

VIII. *History.*—This experiment was conducted like the former, but the dog was small, and only four ounces of blood could be drawn away, when a complete asphyxia was produced. The same quantity of human blood was injected, after it had lain in the cup for sixty instead of thirty seconds.

Symptoms.—The dog revived for a time, respiration and circulation were renewed, but the recovery was temporary, and it died on the table.

Observations.—The dog which was made the subject of this experiment was perfectly healthy, and though small, full-grown. The small quantity of blood drawn away, not exceeding four ounces, renders the death the more remarkable.

These experiments prove, apparently, that the blood is unfitted for its functions by lying between thirty and sixty seconds in the cup of the syringe; but they are invalidated by those which follow.

Experiments in which the dog was drained of its own, and supplied with human blood.

IX. *History.*—More than seven ounces of blood were in this experiment drawn from the femoral artery, and six ounces of human blood were injected in their stead. This was received in the cup of the syringe as it flowed from the arm, and thrown directly but tranquilly into the vein.

Symptoms.—In consequence of the bleeding, the usual symptoms were produced, and terminated in profound fainting; but the dog revived after the injection. Sensibility was restored, to-

gether with tension of the abdominal muscles, respiration, and a circulation so active, that the blood gushed from the arterial tube. These symptoms, however, continued a few seconds only, when the action of the heart became very irregular, and the dog gasped, gaped convulsively, made ineffectual attempts to vomit, and died.

Observations.—This dog was rather large, very lively, and did not undergo much fatigue during the operation. It will be observed too, that the quantity of blood drawn away was not very large, considering the size of the animal, and that a temporary revival was produced; circumstances which make death the more remarkable. Preceding experiments put it, I think, beyond a doubt, that if canine blood had been transfused instead of human, the animal would have recovered.

X. History.—This experiment resembled the former, some slight differences excepted. Eight ounces of blood were drawn away from the femoral artery, and six of human blood were injected in their stead. The blood was thrown in without hurry, as fast as it flowed from the arm, in quantities of half an ounce, without being permitted to lie in the cup; but in consequence of the hasty and careless manner in which the apparatus had been put together, a few bub-

bles of air got into the veins. See Experiment V.

Symptoms.—Apparent death was produced by the bleeding; but as soon as the human blood was thrown in, the animal revived, and the blood, beginning again to circulate, flowed, though feebly, from the femoral artery; in the course of a few minutes, however, the same symptoms occurred as had preceded the death of the former dog: the animal gasped, yawned convulsively, and vomited; and after lying about an hour upon its side in a state apparently approaching to fainting, it expired.

Observations.—The general course of this experiment resembles that of the former; and it may be observed, that the small quantities of air which entered the vessels were not sufficient to occasion death. The proof of this assertion is derived from experiments which will be presently related, and from the event of the Vth, in which a similar accident occurred.

XI. *History.*—In this experiment, four ounces of blood were drawn from the femoral artery, and three of human blood were injected by the vein, in quantities of half an ounce at a time.

Symptoms.—The bleeding produced the usual

symptoms, but the apparent death was not so complete as in the preceding experiments; it may be observed, however, that the revival after the injection was more perfect, as the animal did not vomit, and was able to walk, though unstably. Two hours after the injection there was thirst, languor, and debility; and the pulse was so small and weak, that it could not be distinctly ascertained whether it intermitted or not. These symptoms, however, gradually subsided, and on the *third* day it appeared to be rapidly recovering, but drooping a second time one or two days afterwards, it died on the *sixth* with a dropsy of the pericardium. An ounce of fluid had accumulated in this membrane, but there were no signs of inflammation, nor was there dropsy of the other cavities.

Observation.—This dog was very small, but healthy and lively.

If we may rely on these experiments, the human blood cannot be safely substituted, *in large quantities*, for that of the dog. It is certain that death was not produced accidentally, from the hurry of injection, or from plethora, from suffering the blood to lie in the cup of the syringe, or the dog to continue too long in a state of apparent death before the injection was performed, for all these accidents were carefully obviated.

Experiments on the Transfusion of the venous, instead of the arterial blood.

XII. These experiments were conducted in the same manner as those in which arterial blood was injected, but as the blood flowed rather sluggishly from the femoral vein, the injection was slowly performed. The dogs recovered.

Experiments on the injection of air into the veins.

XIII. *History.*—In this experiment five drams of air were injected into the femoral vein of a dog, in quantities of a dram at a time, and at intervals of thirty or forty seconds. The quantity of the air was measured by means of the syringe.

Symptoms.—During this operation, slight difficulty of breathing was produced, and the dog sighed deeply; the pulse, too, became unequal and the muscular system tremulous. As soon, however, as the animal was liberated, it leaped from the table, licked its wound, and seemed pleased with caresses. On the following day it was languid and restless, and the muscular tremors continued; the pulse intermitted occasionally, and the dog vomited once. In other respects it ap-

peared tolerably well, took food greedily, and revived completely by the third day.

Observations.—The dog which was made the subject of this experiment, was scarcely larger in the body than a full-sized cat, and very delicate. Its size considered, the quantity of the air which was injected is large ; yet all the symptoms may be imputed, in part at least, to the alarm which the operation excited. The effects of these agitations seem sometimes to continue for hours, if the impression is strong, especially in dogs which are naturally timid, as this was.

XIV. History.—About three drams of air were blown from my own lungs into the femoral vein of the dog ; the greater part of it was introduced at once.

Symptoms.—The respiration and circulation were not materially affected, and the dog suffered so little, that a day or two afterwards it was led into the country.

Observations.—This experiment was made on the same dog as the former, and in the same manner ; but the air which was injected had previously passed through the lungs, and three drams were thrown in instead of five. The animal was less alarmed than in the preceding experiment, and

hence, perhaps, in part the mildness of the symptoms.

From the two preceding experiments it seems that air, whether atmospherical or from the lungs, may be injected into the veins of the dog, and this too in considerable quantity, without fatally deranging the functions.

Experiments on the time required for the coagulation of canine blood.

XV. Three drams of blood, taken from the femoral artery of a dog, and collected in the bottom of a conical wine-glass, began to coagulate in about ten seconds; were wholly coagulated in about eighty. In a second experiment the blood began to coagulate in about ten seconds; and was wholly coagulated in sixty.

The blood of the dog, therefore, coagulates more rapidly than the human.

N.B. As these experiments were designed merely to establish the general truth, they were not made with nicety.

**HISTORY OF THE PROGRESS,
AND
INQUIRY INTO THE CAUSES
OF THE
YELLOW FEVER,
AS IT APPEARED IN THE ISLAND OF ANTIGUA
IN THE YEAR 1816.**

By A. MUSGRAVE, M.D.

OF ANTIGUA.

COMMUNICATED

By DR. FERGUSSON,

INSPECTOR OF HOSPITALS.

Read Jan. 20, 1818.

IN the early months of the year 1816, the island was in as healthy a state as one of equal population could well be expected to be under any circumstances or in any variety of climate. Indeed, from the time of my arrival in the West Indies, which was in November 1814, up to June 1816, I considered Antigua as peculiarly fortunate, and wondered whither had vanished those formidable diseases which in the schools of medicine are impressed upon the student's mind as the greatest

scourges to which humanity is obnoxious. Fever and dysentery, in their aggravated forms, seemed to have deserted the west for some less favoured region. No epidemic of any description had made its appearance for a very considerable lapse of time either among the white or coloured inhabitants, and Europeans were induced to flatter themselves with as great an immunity in this, as their own, generally accounted, more salubrious climate could possibly confer. A few sporadic cases of fever were undoubtedly met with at intervals, but these were not fatal, and, with few exceptions, easily yielded to the remedies employed for their removal. The severest instance I ever remember to have seen previously to the period I am about to notice, occurred in December 1815, in the person of the master of a vessel trading from Liverpool. He was remarkably robust and plethoric, and the attack appeared to have been induced by great exposure to the sun in the prosecution of his duty. The brain was the organ which principally suffered: the determination of blood towards it was alarming; but the symptoms were eventually subdued by the early and most liberal use of the lancet. At four bleedings upwards of 100 ounces were drawn. Soon after his recovery we were called to a young man, recently arrived from England, whom we found with nearly the same symptoms. A similar mode of practice was pursued as with our first patient, and the result proved equally successful. In February 1816, an officer, major

in one of the regiments stationed here, was attacked and recovered under our care, and the last instance I can at present recollect was that of a Frenchman in March, also favourable in its result. The officer alluded to had resided many years in this climate, but was a good deal exposed to the damps at night and rays of the sun by day, in travelling from a neighbouring island in a small passage boat, previously to his illness; which appeared to me sufficiently to account for it. Indeed both these cases were too completely isolated, to admit of their being viewed in any other light than as sporadic.

With results so uniform to a few scattered examples, can it be wondered that an inexperienced but sanguine practitioner, who had never viewed the disease in its more concentrated form, should be induced to think, that if ever a patient in fever was lost (provided he was seen on its first accession), the failure must be in a great measure attributed to his medical attendant? I sincerely wish that I had never been since constrained to relinquish such pleasing, but I lament at the same time to acknowledge, delusive confidence.

On the 18th of June 1816, two seamen were admitted into the parochial hospital, situated on Rat Island, on the footing of accidental poor. They were stated to be out of employ, and to have been taken ill at the house of a coloured woman, in the

north-west part of the town called the Point, where they had boarded for some weeks. They had been evidently attacked with fever, and, from the account received, one had but just commenced, the other had proceeded as far as the close of the third day of the disease. On visiting them I will candidly confess, that the symptoms at that time by no means impressed me with any particular dread of their afterwards assuming the character which was ultimately evinced. No headach or other uneasiness was complained of except (what they themselves attributed to a continued recumbent posture) about the back and loins; but they mentioned that they *had* suffered much from severe pain across the forehead. The febrile heat had considerably abated if it had ever been great. He who had been longest indisposed, said he had thrown up a good deal in the morning, but was then relieved from nausea. Their pulses were under 100, and no pain or burning sensation was felt about the epigastrium. I prescribed for them as had been usual during the remissions in those cases which have already been touched upon. The lancet of course was deemed inadmissible on account of the advanced stage of the disease. I was shocked to hear on the following morning from Dr. Daniell who had visited the Hospital; that he considered both the lately admitted patients in imminent danger. Their stomachs had become extremely irritable during the night. On one a light yellow suffusion was perceptible over the whole

body; and to Dr. Daniell, versed by long experience in these appearances, the fluids thrown off in retching seemed suspicious and indicative of approaching black vomit. He was but too correct in his prognosis; and the scene with both of them closed on the fifth day, preceded by this symptom, and all the others which are more exclusively attributed to the Bulam or Yellow Fever by those who attempt to distinguish it from the common form usually denominated bilious remittent.

By subsequent reflection I have never been divested of the impression that these were instances somewhat anomalous both in their symptoms and progress. That I, inexperienced as I was, should be deceived in a disease of which I then knew nothing but what I had been able to collect from writers on the subject, cannot create a moment's surprise to any individual: but when I retrace in my memory the appearance of these patients when I first saw them, and contrast it with that of others, at the same advanced stage, whom I afterwards saw fall, as they did, its victims, I look in vain for the dull, suffused, and watery eye—the parched, discoloured tongue—that peculiar anxiety and restlessness, with other marks not easily described, (but of which a description is unnecessary to those who are conversant with Yellow Fever,) the presence of which very frequently decides the attendant in a fatal prognosis, when the patient denies, like them, all local uneasiness, and replies to your

inquiries that he feels considerably better, when perhaps the pulse does not number above 90, and the stomach may be yet comparatively retentive.

But to return to my subject. These were decidedly the *two first* cases which appeared of the epidemic under consideration. Another seaman was admitted under precisely similar circumstances on the 24th of June, (which was the fourth day of his disease,) and died with black vomit in about twelve hours afterwards; and he was followed by a fourth from the same quarter, who had been also allowed to go on to the third day before assistance was called for. The termination was likewise fatal, but with this difference, that the brain and not the stomach was the organ affected. The latter was perfectly retentive to the end, and the patient died 'comatose; a fact of which I shall hereafter avail myself in considering another point. These two last persons had not, as far as we could learn, any communication either with the two former or with each other.

The cases now became numerous, but entirely confined to that part of the town. The individuals affected were, generally speaking, sea-faring people; but that was to be accounted for from these being the only residents there who were fit subjects to be acted upon. Where reduced circumstances or other causes obliged new comers of a different description to take up their abode within what then

appeared to be the sphere of its influence, we found that they experienced no greater exemption than seamen from the prevailing malady.

The first death which happened in what I may term private life, was that of a landed proprietor who had only been a few months in the island for the purpose of inspecting his estate. He complained first, as I understood, (for we did not attend him,) on the 6th, and died on the 11th of July. He was during his illness and at the time of his death at his own house in the country; but it was clearly ascertained that, the day before he was attacked, he had dined with a friend residing in the quarter of the town already alluded to under the denomination of the Point, and that he had been frequently in the habit of doing so, and of not returning home till late at night. It may not be improper, however, to mention *en passant*, that the dwelling-house on the property where he resided, is almost completely surrounded by marshy ground.

The next case conspicuous from its fatality, with all the distinctive marks of singultus, hæmorrhages, black vomit, &c. was that of our assistant, who was taken ill on the 15th of July. His residence, though not within the limits I have described, was still in the west quarter of the town leading towards them. Besides, poor fellow! his duty had frequently called him in the evening to visit the

sick lately admitted into the Rat Island Hospital, and both in going and returning he was necessarily obliged to pass (sometimes as late as nine or ten o'clock) through the Point, and of course was exposed to whatever was to be considered the cause of the late alarming frequency of fever. I am not unaware that it may be urged by its advocates, that he was also fully exposed to contagion in these visits. The fact cannot be denied if we admit the *existence* of contagion; but I must refer all arguments on this head to their proper place.

At the same time that our assistant was confined, and during all the latter part of July, several examples occurred in the streets intervening between that in which he resided and the Point, and many of them in persons of the first class of society; but it was not till the beginning of August that they extended to the body of the town. Soon afterwards, however, the disease spread rapidly, and I was on the 10th called to the officer commanding the detachment of the 4th West India regiment then in the barracks (which is directly to the eastward of St. John's); and at that period there was scarcely a part of the town in which there was not, or had not been, a case of fever. In one street which is termed the Pasture, where the principal dry good stores are kept, the instances were both most numerous and most fatal; which leads me next to notice the different classes of inhabitants which more particularly

suffered ; but, previously to doing so, I must endeavour to give satisfactory answers to two queries which I am convinced will comprize a very considerable portion of the information you are anxious to obtain. 1st, What are the local peculiarities of the north-west part St. of John's called the Point, with its relation to the surrounding country ? and 2dly, Whence were those seamen who first perished by the epidemic traced to have arrived, and under what circumstances ?

In reply to the first it will be necessary to say but little. The houses there are not merely exposed to currents of air which have previously traversed a marshy surface, but they are absolutely standing in a swamp. Three or four streets cannot with safety be passed on horseback, and the path, which those on foot are obliged to select with the utmost circumspection, is afforded only by artificial ground. The house of the coloured woman from which the two first cases emanated on the 18th of June, forms one of a row terminating the town to the north-west. From the very threshold of her door stretching to the northward and north-west, an extent of marshy ground proceeds for nearly two miles, and also to the north-east for a considerable, though not so great a distance : and as I have already stated that three or four streets to the southward of this are absolutely built in a swamp, the inference is plain, that from whatever quarter the wind may blow, it will bring with it a

noxious impregnation ; nay, from the imperfect manner in which these huts are constructed, miasmata must spring up from beneath the very beds they contain. When we reflect on these indisputable facts, we are constrained to wonder, not that an epidemic should have originated there in 1816, but that every revolving year does not bring with it melancholy examples of the baneful nature of the exhalations which we should suppose are necessarily generated in such a situation. In fact, although nothing so extensive is to be met with elsewhere, every part of St. John's may be deemed (with few exceptions) more or less exposed to the effects of marsh effluvia. Swampy tracts are seen just beyond the southern outskirts of the town, and to eastward they are abundant at some little distance, although a good deal intercepted by what is called Government Hill.

In reply to my second query, I shall transcribe the answer to a note, written by me to the owners of the vessel in which the two seamen who were first attacked arrived in the island, requesting particular information on the subject, and which I think sets the point of importation completely at rest. “ Agreeably to your request, we inform you that the Achilles arrived from Charlestown on the 25th of April 1816. At the time of her arrival the crew were perfectly healthy. The two men who died at the hospital were discharged from the vessel on the 5th of May following, conse-

quently the fever which they were attacked with must have been taken since that time."

The two succeeding victims in the Rat Island Hospital I ascertained to have been equally long unemployed, to have arrived in vessels whose crews were perfectly healthy, and to have themselves continued so for a considerable period after their discharge. In corroboration of these circumstances I may also state, that no individual, either in medical or private life, has ventured to hazard a suspicion of the fever's having been derived from foreign origin, founded on any alleged fact or shadow of fact, although the doctrine of contagion has been, I believe, feebly supported by one of the former class, but by *one* only.

The epidemic in Antigua differed little in its selection of subjects from what has been invariably remarked by every writer on Yellow Fever. It for the most part attacked Europeans, and spared the native inhabitants: but of all descriptions of the former who came under its influence, the Scotch were those on whom it appeared to commit its greatest ravages. The street called the Pasture, formerly alluded to, is almost exclusively occupied by them (so much so as to have obtained the vulgar appellation of the Scotch Row), and here the cases were principally accumulated, giving a proportion of deaths exceeding any thing observed in other parts of the town. This is a

fact in my opinion worthy of attention ; for although the individuals there affected were generally young, sanguineous, and recently arrived, they were still in that situation universally believed to ensure not only a temperate, but an abstemious mode of living : they were chiefly clerks and apprentices in the different dry good stores, at once too respectable and too much under the controul of their employers to descend to the use of spirituous liquors, and too subordinate to be allowed any quantity of wine. On the other hand, almost all those who were invaded among the higher ranks of society recovered, and not a few of them where, from the short period of their residence in the West Indies, added to their general habit of body, we had every reason to anticipate an unfavourable termination. Besides, the instances were not only on an average more fortunate when they did occur, but many of this description of persons altogether escaped, and enjoyed the most perfect health during the whole course of the epidemic. This was strongly exemplified in a gentleman personally known to you. He had but lately visited the West Indies for the first time in his life ; was of that temperament supposed to be more peculiarly obnoxious to the disease ; he lived freely ; exposed himself to the sun in a manner reprobated by his friends as the highest degree of imprudence ; did not hesitate to visit any acquaintance labouring under fever ; and yet was favoured with complete exemption from the most trifling indisposition.

I am far, very far from wishing to inculcate any doctrine calculated in the most distant degree to promote excess or irregularity ; but from what I have seen I feel convinced, that generous living, short of intemperance, such as is usual with the superior classes of society in this island, (among whom, it is highly gratifying to state, intoxication is almost unheard of,) will not prove detrimental ; and that freely open bowels, induced by the frequent exhibition of saline or other cooling aperients, the habitual use of the cold affusion in the morning, and wearing flannel next the skin, which guards against all sudden transitions of temperature, will be found by our European visitors to constitute the best prophylaxis. In advancing these sentiments, I am not unaware that they militate against the generally received opinion, and particularly against that of a late respectable writer on tropical climates, Mr. Johnson ; but I cannot at the same time forget that they have an advocate in the eminent professor at present in the practical chair at Edinburgh, Dr. Gregory, whom I have heard more than once relate a fact which occurred at Leyden in a society or club of four and twenty young men, to each of whom a bottle of claret was by agreement allowed. One only of the number declined availing himself of the rule, and he alone fell a victim to fever. The Doctor's accompanying observation I transcribe as it appears in my note-book : " I must not be understood to recommend a bottle of such wine as is in common

use here, for that would be too much, but a moderate allowance will certainly prove beneficial."

Among the Europeans, I must confess my surprise at finding that little distinction was made by the disease between the full-blooded and those of a different description, or between males and females : its attacks on the latter, indeed, appeared at times to be marked with augmented virulence. The period commonly allotted by authors for assimilation appeared likewise to be too much limited, for many sufferers had resided four or five years, or even a much longer time in the climate. Our assistant, whom we lost as I formerly mentioned, had been two years and a half in the island ; was necessarily during that time, from the nature of his profession, inured to exposure to the sun and every vicissitude of weather ; and was of as sallow a complexion and spare (I would almost say emaciated) habit of body as will be found in one of a thousand who have never from their birth been beyond the range of the tropics.

Although the native inhabitants were, as I said before, generally spared, they were not altogether exempt from the prevailing influence. We met with three or four cases among them in our practice, favourable however, and all in individuals who had at some time or other changed the climate for Europe, except the infant child of a merchant. This last was indeed a very singular

instance : the attack was ushered in like the infantile remittent fever so well described by Dr. Pemberton, but in its subsequent progress it assumed all the appearance of the epidemic. Decided black vomit and corresponding evacuations seemed to menace a speedily fatal result ; but our patient, nevertheless, to our great surprise recovered. Here Dr. Daniell and myself were joined in consultation by Dr. Doig, a practitioner deservedly eminent, and familiar from long experience with the appearances alluded to. My friend Dr. Coull has also informed me, that two children born in the island, but of European parents, died under his care with black vomit and other marks of Yellow Fever. I attended myself a coloured child who threw up just before death a matter greatly resembling black vomit ; but as the fever during its course was attended with convulsions and other symptoms indicating the presence of worms, I am inclined to conjecture that grumous blood poured out from the eroded internal surface of the stomach and intestines, and mixed with their other contents, was the cause of this seeming analogy ; as I have not heard of one clearly authenticated case of the disease occurring in any but a white subject during this its last prevalence in the island.

While the epidemic thus pursued its course in St. John's, the inhabitants, white and coloured, both in town and country, *who did not suffer from*

fever in some form, were, I think, more than usually exempt from other diseases. Intermittents were, as I shall soon have occasion to notice, both more frequent than ordinary, and more severe in their paroxysms ; but although the managers and overseers are largely composed of Europeans, the form of attack under consideration could never be said to be *general* among the estates. A case now and then occurred, but not till its progress was considerably advanced, and it was long (as you must be already informed) before it reached the troops at the Ridge and Monk's Hill. I omitted before to remark, with what singular precision it would occasionally select its subjects. A short pause in the succession of cases would not unfrequently lead us to flatter ourselves with being at length released from the presence of our unwelcome visitor : but if at such a time an European came only from a neighbouring island, he was most probably speedily attacked. This happened even with a gentleman (unusually plethoric to be sure, but still a West Indian by birth,) who had not changed the climate for many years ; and as late as the 6th of February, with the lady of an officer of the 1st West India Regiment recently from Barbadoes, a case which proved malignant in the highest degree, and terminated fatally : indeed I sometimes fear that its present cessation proceeds only from a dearth of subjects.

Having now considered as far as time and recol-

lection permit, your first, second, and (collaterally) your sixth query; comprising the commencement and origin of the fever, its subsequent progress as it affected the different classes of society, and the state of health of the inhabitants, coloured and white, in town and country, who did not suffer from it during the time it was epidemic, I shall proceed to take up your third query, or “Whether contagious or not?”

In reply to this I can declare decidedly for Dr. Daniell and myself, that we never met with or heard of a single instance of the disease, which could not be accounted for in a manner perfectly satisfactory, without attributing to infection the most trifling agency; and I believe there is in this opinion not above one dissentient voice among the whole body of practitioners (of whatever description) in the island. All those gentlemen with whom I have conversed on the subject, entertain not the smallest doubt of the non-contagious nature of Yellow Fever; and some of them whose ideas have been formed, not from this single epidemic, but from the experience of a series of years, more particularly when it was extremely prevalent in 1802.

It cannot be denied, that from the disease invading in succession several individuals in the same house or family, a colour of argument is sometimes afforded for its being contagious; but those who

avail themselves of reasoning so fallacious, must surely wilfully overlook the plain and simple explanation so readily offering itself of a fact, which I am far from intending to controvert, namely, that all persons so situated are usually under similar circumstances, and consequently exposed to the influence of the same causes which induced the attack in those who were primarily affected. Could one authenticated instance be brought forward, where assimilated West Indians (by which I mean such as have not recently or for any length of time changed the climate,) who resided in the house with an European suffering from Yellow Fever, were successively seized, my creed might be shaken, although certainly not altogether overthrown after the mass of evidence which has fallen under my observation : but I venture to affirm, without fear of contradiction, that no such instance was afforded by the epidemic as it lately pursued its course in Antigua ; for of the few native residents who were included, none, except Dr. Daniell, had had any previous communication with the sick ; while, in verification of what I advance, proofs were multiplied as often as the matter was put to the test. Two or three are all that my limits admit of being particularly enumerated.

When the seamen, mentioned as the first examples of the disease, were brought into the parochial hospital at Rat Island, there were many patients, and those neither black nor coloured, in

the very wards which received them, labouring under trifling complaints, as ulcers, &c. There were also resident in the hospital the matron and several members of her family, and yet we did not find that one out of the whole number became infected.

A vessel arrived in the harbour from Point à Petre, Guadaloupe, at the time our fever was at its height. It also prevailed at the port she had quitted; and although she had been healthy while there, the captain felt himself unwell a short time before he landed, and sent for us immediately on doing so. We found him with the usual symptoms; and six of his crew, which consisted only of twelve, were subsequently under our care. These were all landed and received into a boarding-house, but not a single instance occurred of an attendant suffering in consequence.

Two remarkably fine young men came from a neighbouring island merely on a visit of pleasure, who, although Europeans, had been for some considerable time in the West Indies. Soon after their arrival, one, without its being traced to any exposure to infection, contracted and died of the disease. The other followed him in a few days; but of a very numerous acquaintance who were engaged in the closest attendance on them, not a single individual was attacked. The particulars of this melancholy occurrence I became acquainted

with from their notoriety only, not having seen either of the patients; but as at first view they appear to act as a double-edged weapon, let us consider whether they are to be regarded as supporting or militating against the doctrine of contagion. The facts speak for themselves; and as they exemplify what is constantly observed in every parallel case, the inference to be drawn from them comprizes, in my opinion, all that could be said, were I to protract the discussion to an octavo as large as Dr. Bancroft's. The unfortunate young men were both fit subjects to be acted upon, and equally exposed to the prevailing cause of fever; but their friends were differently circumstanced from long assimilation to the climate or from being natives of it, and consequently unsusceptible of the influence which proved fatally active with them.

I should imagine that a disease positively would shew little regard to distinctions of colour or minute varieties of constitution, and would invade indiscriminately all classes of persons exposed to its immediate operation. This we know to be the case with small-pox, measles, &c. and if we admit the same with respect to Yellow Fever, how can we account for the following fact? His Majesty's ship *Brazen* being detained in our harbour on some duty, her crew became dreadfully unhealthy, and at length the surgeon himself being confined, in November it became necessary to land the sick.

The Naval Hospital at English Harbour having been closed on the breaking up of the establishment there, an order was given for their admission into the Military Hospital at St. John's ; and thirteen or fourteen cases were accordingly placed under my care as acting medical officer at this port. They proved as malignant in their progress as cases possibly could be. Several privates of the 4th West India Regiment were in a contiguous ward* ; and in so small an establishment I could not have prevented, had I been most anxious to do so, the freest communication between them and the seamen. The bedding, &c. covered with black vomit and hæmorrhages from those who died with these fatal symptoms, (although every precaution was taken to ensure cleanliness,) were not destroyed ; and yet, neither during the time the patients continued there, nor after the hospital was cleared of them, (now upwards of three months,) has one individual, who was in attendance, or in any manner connected with the detachment at the Barrack, laboured under a disease at all resembling Yellow Fever. Indeed, from what I saw in that and other instances, I feel convinced that the disease cannot be propagated even by subjects brought from on shipboard, whence the most plausible arguments are derived in favour of contagion. As you have yourself so justly observed in your paper recorded

* The wards of that hospital had no doors ; the communication was therefore perfectly open, and the intercourse unrestrained.

in the Medico-Chirurgical Transactions, it cannot be refuted that the undue accumulation of human effluvia in a crowded ship or prison will in the West Indian, as well as other climates, prove productive of temporary pestilence; but this is only because these unduly accumulated effluvia assume, in such situation, the baneful qualities of miasmata and other agents which give rise to the same disease on shore, and cannot proceed from the body's having acquired the power of itself communicating the infection: for remove and place it where free ventilation is procured, and it will prove to be altogether innoxious. But to return to the proofs of non-contagion as they presented themselves in Antigua.

Were I to adduce, in myself, an example of one who never having passed through the disease, escaped under the most complete and long continued exposure to infection, had it existed, it might be urged that idiosyncrases are not to be admitted in opposition to general rules; but can this argument be extended to every member of a family enjoying equal immunity with me, to whom I not unusually returned, after visiting my patients, with clothes stained by the black vomit, so suddenly and to such a distance ejected, (a characteristic of this symptom,) as to preclude my avoiding its direction? Indeed, a medical friend of undoubted veracity has informed me, that he once, while inspecting the tongue of a patient, absolutely received

this matter, not only over his whole face, but part of it into his mouth. He could not but feel uncomfortable under the circumstance, but no injurious consequence ensued. Again: it was not only that Europeans residing with West Indians did not infect them; but in many instances where Europeans themselves were for days together in the fullest manner open to the operation of contagion, (as where a wife attended on her husband or *vice versa*,) they underwent the exposure with perfect impunity: nay, I once saw the wife of a sailor stowed into the same cot in which her husband lay with this fever in its worst form, and yet escape under every predisposition that could be conceived in a full blooded and unassimilated subject.

The cases also, after the disease extended beyond the Point, did not go progressively from house to house or from street to street; but, generally speaking, the sufferers had had no sort of intercourse with their predecessors, and I often ascertained that they had never been within a considerable distance of a house containing a patient.

Could evidences such as these fail to bring with them conviction to my mind, that communication with the sick had no influence whatever in disseminating the disease? Lastly: I cannot omit once more to advert to what was recently ob-

served, that many Europeans who arrived here towards the decline of the epidemic, when not one case was to be found in town, and who never entered a house in which one had previously lain ill, were almost immediately attacked. Was this to be ascribed to contagion, or to some other latent cause to be sought for in the general atmosphere they inhaled?

Your fourth, fifth, and ninth queries, viz. Whether capable of affecting the human frame more than once? What is its connexion with fevers commonly supposed to originate in marsh miasmata? and Whether it ever begins as an intermittent or breaks off into that form? I shall take up in conjunction, as they are so intimately blended, that it is impossible to attempt answering one, without at the same time adducing facts which must tend considerably to elucidate the discussion of the others. Here, in my opinion, all ingenuity of argument is totally misplaced. Points like these are to be determined only by a plain but accurate statement, and an unbiassed survey of what has fallen under the observation of those of the profession who have had extensive opportunities of seeing the disease.

Had no one instance occurred during the late prevalence of Yellow Fever in Antigua, where an individual was twice affected, few, I imagine, would differ from me in considering *that* circum-

stance by no means conclusive as to the possibility of such an event. This would be but *negative* evidence on one side, which, however frequently adduced, and under circumstances however varied, must necessarily yield to one *positive* and well-authenticated proof to the contrary. But here it happened, that for a period so limited, the matter was more clearly, and I may add fatally decided, than could well have been expected, even had the disease never been supposed to indemnify those who had been once attacked from all future risk of its invasion. The first example we met with inimical to the doctrine, of late so warmly supported by Mr. Pym and others, was in the person of a young, full-blooded, and recently arrived European, who sent for us on the 6th of August, at which time I have before observed that the epidemic was at its height. We found him with a quick and full pulse, flushed face, suffused eye, acute pain in the forehead and in his back and limbs; in a word, with all the usual precursors of the disease in its most violent form. He was instantly bled from a large orifice till he was perfectly faint: his bowels were smartly opened, and the cold affusion administered. By these means the fever was speedily subdued, and he returned shortly afterwards to his duty as clerk to a merchant in town. On the 27th of the same month we received another summons to attend him with the same symptoms as before. The treatment was similar, but the attack more obstinate; it ran on

to the fifth day, and he narrowly escaped after the most distressing irritability of stomach had come on.

A young man, arrived from Scotland about the middle of August, had not been above a week in the island when he was seized by the epidemic. We were not his medical attendants, but Dr. Daniell saw him in consultation. The fever did not entirely leave him till the fifth day, and although he survived, it was certainly contrary to expectation. About three months after his recovery he was attacked on an estate where he had been employed as overseer, to all appearance, with an ordinary intermittent paroxysm. Our assistant visited and prescribed for him; and from the reports received, we concluded him to be going on well, (though with regular quotidian returns,) till I was called to him, I think it was about the sixth day of his disease. He then had hiccough, great irritability of stomach, and that indescribable anxiety which I have before alluded to. Yet, singular enough to say, the fever continued apparently to intermit for some days, leaving, during the intervals, the stomach comparatively quiet, and the singultus by no means distressing. At length, however, the symptoms became continued; and when I saw him about twelve hours before his death (which took place on the fourteenth day,) he was yellow—the appearance of his eye characteristic—his vomits of the most decided black, and

there was considerable hæmorrhage from the nose, mouth, and anus, with incipient low delirium. This was the only case in which I saw hiccough (in my experience a more fatal indication than even black vomit) occur so long before death. It usually announces a speedy termination ; but here it was present, with more or less severity, for upwards of a week. Soon after this, a gentleman holding one of the first public offices, and recently from Europe, who had about two months before recovered from a very alarming participation in our epidemic, was again attacked in the country with all the usual symptoms. He was treated as usual, and the fever, we thought, had quitted him in eight and forty hours. It however returned next day, and continued to be quotidian till the fifth from its commencement, when it finally disappeared.

A merchant in town, an European by birth, but some years resident in the island, about three months after a very severe continued attack, complained of nearly the same symptoms as had ushered in his former illness. In their progress they shewed more evident remissions than before, but did not entirely subside till the usual period of the fifth day.

The last case I shall particularly notice as affording direct evidence of the possibility of a second attack of Yellow Fever, occurred under the

most melancholy circumstances. A young man, the son of one of the most eminent merchants in England, was sent out to this island, where his father is extensively connected, in order to avoid the winter, being supposed to have a tendency to consumption. "*Incidit in Scyllam qui vult vitare Charybdim*"—he had been but a few days among us when the usual symptoms shewed themselves. On the 10th of December he fell under my care, and Dr. Daniell being then unable to attend to business, I was joined in consultation by Dr. Osborn, who, although retired from practice, was kind enough to act as a friend on the occasion. His symptoms assumed the most acute form, and did not yield in violence till he had been at three different times blooded to fainting, or rather to perfect coldness. He however completely recovered, and assumed his former habits of life. On the 30th of January he was again attacked. No exertion—no attentions were spared by Dr. Osborn, Dr. Daniell, and myself, to avert the fatal termination. One of us was almost constantly with him, but every thing proved unavailing, and he fell a victim to the disease on the close of the fifth day.

Did my time and the limits of this brief communication admit it, I could collect many additional cases from the practice of others, corroborating what I consider established by the above facts, falling as they did within the sphere of my

individual observation. I am not unaware that solitary instances of this sort are to be found on record ; but what should we say of the antivariolous powers of the vaccine, or of the security afforded by one attack of small-pox or measles, if the experience of a single practitioner, during a few short months, could adduce so *many* proofs militating against an opinion which is even generally received ? My second example, indeed, may be said not altogether to answer the usual description of Yellow Fever ; but this argument cannot be advanced by those to whom alone it could prove useful, for it was “attended with the fatal symptoms peculiar to Bulam Fever, viz. the black vomiting and a peculiar bloated appearance of the countenance*.”

I have often smiled at the idea of the following observation of Mr. Pym, which (although I cordially subscribe to it,) is abundantly singular, as falling from one pretending to expound the means of accurate diagnosis between two important diseases which have hitherto been confounded. “In mild cases, however, of this disease, it is impossible to point out any symptoms distinguishing it from attacks of fever from any cause ; and even in bad cases, until the *fatal symptoms* make their appearance, I may say (excepting its prevailing epidemically) that it is as difficult to decide posi-

* Pym.

tively upon its real nature, as it is in the fever of small-pox before the appearance of the eruption." What inference, then, are we to draw from this admission? The only obvious one is, that Mr. Pym is never satisfied as to the nature of the disease he is treating, till his patient is on the very verge of death; and consequently can never determine what plan is to be adopted, till that period arrives when all will prove equally abortive—a circumstance which we cannot but regard as truly unfortunate, when we reflect that he in the sequel assures us the remedies adapted to each are essentially distinct, nay almost opposed, in their nature. If his object be to contend, that *black vomit* never occurs twice, few, unfortunately, will be able to bring forward instances in refutation of his doctrine, and I presume he means to reject as spurious, all those actually adduced, which do not stand this trying and indisputable test. I shall therefore make but one additional observation which naturally arises out of that quoted from himself, viz. that had the occurrence of the eruption subsequent to the fever in small-pox proved as invariably fatal as that of black vomit in Yellow Fever, the point of indemnity in the former by means of one attack would have been far, very far from being distinctly ascertained even at the present moment. But to put all this entirely out of the question, I shall now endeavour to prove the impossibility of any such peculiarity being attached to this disease, by establishing the identity of it with remittent and

intermittent fevers engendered by marsh miasmata, and that its seeming variety entirely depends on modifications of constitution, habit, atmosphere, &c.

Had Mr. Pym, Dr. Gilpin, or any one holding their opinions, practised in Antigua during our late epidemic, still prepossessed with the idea of black vomit being distinctive of Yellow Fever, I venture to assert, without fear of contradiction, that he or they (spite of every preconceived notion) must in candour have admitted, that a disease, at least answering in every respect the description given by themselves, could ostensibly be produced by miasmata alone; and that on comparing a mass of cases occurring in town and country, with Creoles and Europeans, a continued chain could be traced, link by link, from the most concentrated form as it invades new comers, to the simple intermittent which we so frequently meet with among the slaves. Indeed, were I to be asked in which of the two modifications of fever, the concentrated or the remittent, black vomit more usually occurs; I should say, from my own experience, in the last: but no general rule, I am convinced, can be framed; for it is impossible to predict in the first stage which of the organs, the brain or stomach, will ultimately suffer. Thus much, however, is pretty certain, that if one be once decidedly selected, the other will be afterwards comparatively little disturbed.

Out of the cases which I formerly mentioned, when on the subject of contagion, as having been brought from Guadaloupe, two proved fatal. The similarity of circumstances and of situation—everything conspired to shew the diseases to be identically the same; and yet one died comatose, retaining every thing on his stomach; the other with black vomit, but perfect possession of his faculties till immediately before death, when low delirium supervened. The same was exemplified at the Rat Island Hospital among the first patients admitted there. At the Military Hospital, when the seamen from the Brazen were landed and placed under my care; and in innumerable other instances where the head and stomach seemed to be, as it were, alternately marked as the object of destruction*.

The only diagnostic indication which could possibly attract attention among those enumerated by Mr. Pym, is that of the different shade which is

* I cannot pass over in silence a peculiar instance of evident metastasis from the stomach to the head, which once, but once only, occurred in our practice. A female servant of our governor's suite was attacked with symptoms the most rapid in their progress of any I ever saw. In thirty hours from her first feeling indisposed, hiccough was observed, and within thirty-six decided black vomit, but no particular affection of the sensorium. Suddenly, however, stupor came on with even a degree of stertor in her breathing, and the stomach became instantly quiet and retentive, and remained so till she died after an illness of only sixty hours' duration.

observed in the colour of those labouring under the concentrated, continued, and the remittent form of the disease. In native or assimilated constitutions, the yellow was generally deep, approaching to orange. In new comers a pale lemon more nearly represented the tint. But this is almost as futile a distinction as black vomit. It does not always occur in either form, and when it does, only serves to mark the intensity of the disease and its degree of danger. In a word, it is rather a means of prognosis than of diagnosis. Mr. Pym also lays down as an essential point of distinction between the two forms, (and it would assuredly be a most important one if correct,) that the Bulam Fever does not bear bleeding, while the bilious is relieved by it. I think, however, I shall hereafter shew, that (except he means to confess all his own characteristics fallacious, and to contend that the disease we had to combat here was not the Bulam Fever,) it is indisputable that blood-letting is in both forms our sheet-anchor—the only pillar on which we can securely rest any hope of extensive success. But all the arguments of these gentlemen (plausible to read, but deficient in fact as their basis,) must necessarily fall to the ground, when one instance of the disease is produced, not only evidently arising (as far as we can possibly determine from relative circumstances,) from marsh effluvia, but absolutely commencing as an intermittent, and terminating with all those symptoms which they themselves declare to be peculiar to

the Bulam Fever. One such instance I have already afforded, when illustrating the non-exemption from second attacks; but another, if possible, more conclusive occurred in the practice of my friend Dr. Coull.

The subject was a female, who, although an European by birth, had resided for a considerable number of years in the island. The place where she was taken ill is a short distance from St. John's, and notorious, on account of the exhalations to which it stands exposed, (as indeed is the case with almost all our inland situations,) for the prevalence of intermittents at the fall of the year. A chilly fit, succeeded by febrile exacerbation, created no alarm, and she applied for no assistance. It wore off and returned next day, but still she disregarded it. On the third day, however, her stomach becoming extremely irritable with an unusual protraction of the paroxysm, Dr. Coull was sent for and found her extremely ill. I was requested to meet him on the fourth day, and at that time had Mr. Pym seen her, he would have found an exact representation of his last stage—the snap-dragon face, the peculiar eye, black vomit, and, although to no great extent, hiccough. She died in the course of the next four and twenty hours.

These are cases which all must admit as authority, for they were fatal, and fatal with black vomit; but others occurred which perhaps will prove

not less satisfactory to you, although destitute of this recommendation.

The brother of our unfortunate patient, managing the estate on which she died, had, previously to her illness, nearly himself fallen a sacrifice to the slight importance he attached to a paroxysm of fever which he was led to believe the same he was yearly accustomed to. Each succeeding paroxysm, however, increased in severity, and when I was at length sent for I altogether despaired of his life. His stomach would not retain the smallest quantity even of cold water. The hot stage had then lasted far beyond the usual period; indeed the fever had become continued. The surface of his body was subsequently tinged universally yellow, and although he eventually recovered, it was not without the severest struggle. It may not be unworthy of attention, that at the very time he lay ill, the overseer under him (a man of an emaciated appearance) was labouring under an intermittent in its most ordinary form. I could multiply to any extent, were it necessary, instances like these, but shall content myself with closing my illustrations of the occasional commencement of Yellow Fever under an intermittent guise, by the relation of one more most remarkable case. A man arrived here from Santa Croix about the middle of August as the manager of a company of players. Shortly after he had been in the island he consulted me, stating that he had been for three

years harassed by an obstinate ague, of which he bore in his countenance and general appearance the undoubted traces. I prescribed for and frequently saw him in the paroxysms of a well-marked intermittent, ushered in by rigors and ending in profuse sweats. At first the type was quartan—shortly it became tertian—then quotidian—till at length the attack, although commencing as usual, proved not equally transient. The symptoms became aggravated; coma afterwards supervened, and death closed the scene on the fifth day, the tongue being covered with a black crust, the teeth with sordes, and all the other marks being present which were usually observed when the brain was the organ selected.

I did not include this among the *indisputable* proofs of the intermittent commencement of Yellow Fever, because it was deficient in Mr. Pym's *sine quâ non*, black vomit; I however have no hesitation in viewing it as such, as I have already endeavoured to establish, and I trust not without some success, that this last is by no means essential to constitute the disease, it being apparently a matter altogether of uncertainty, on its first accession, whether it will subsequently fix on the stomach or head as the seat of its ravages. Besides, this case is incalculably valuable as exemplifying, in itself, the gradation, not only from the intermittent, but the intermittent's mildest quartan form, to the concentrated disease which we are

now considering. It clearly demonstrates, that what under gentler influence could continue for years without immediate danger to life, when exposed to that inexplicable baneful activity, which the exhalations here mingled with our atmosphere had acquired, speedily though gradually increased in intensity till it ultimately proved fatal.

Having now, I think, shewn in the least exceptionable manner that the Yellow or Bulam Fever may begin as an intermittent; I may add, that I have, though less frequently, seen it break off into that form.

This happened with one of the patients formerly alluded to as having been twice affected, and with others which it would be tedious more particularly to notice. But if additional proofs were wanting of the intimate chain connecting all those different forms of fever, they might readily have been extracted during the late epidemic from the increased frequency and severity of intermittents among those whose constitutions and habits rendered them unsusceptible of the more aggravated degrees.

Although the island was more exempt than usual from all diseases except fever in some shape, it was astonishing how numerous intermittents were among the blacks on those estates where, from their marshy neighbourhood, they are yearly more or less met with. I always found the sick-houses

crowded with them, and though not fatal they were undoubtedly more obstinate than ordinary. Among the coloured population they likewise extensively prevailed, assuming rather a severer aspect than with the class last alluded to ; indeed, deaths were here and there met with, which, while we could not exactly say they were preceded by the absolute symptoms of the epidemic, were yet accompanied by those so little dissimilar, that I could not help concluding that these people were not altogether exempt from a participation in the general danger. A coloured servant of his Excellency the Governor who had recently arrived from England, shewed symptoms the most closely allied of any we observed among this description of persons : the event, however, was favourable. Many of the whites, too, natives of the climate, and for years taught to look at a particular period for a mild intermittent attack, were surprised to find the paroxysms doubly severe to what they had been accustomed. One instance I particularly remember in a gentleman resident on his estate, where I became not a little alarmed at the great determination which invariably took place to the head inducing delirium with every return of fever. In fine, my dear Sir, so firmly have these, and other facts which I cannot at this moment distinctly call to mind, impressed me with the conviction that intermittent, remittent, and Bulam or Yellow Fever differ but in degree ; and that they are all only modifications of effect from the same

cause, the modifications being influenced by the degree of concentration of the deleterious miasmata, and the varieties of assimilation, &c. in the subjects on which they operate; that it is a matter of the most serious surprise to me how any diversity of sentiment could ever have obtained upon the subject*.

The state of the atmosphere as to moisture, ventilation, &c. presented nothing peculiar to our notice. When the epidemic first broke out, the wind was to the southward of east, and it continued so with little variation during the whole period it prevailed. The weather was generally fine, with the occasional intervention of a showery day. The heat was by no means unusually intense, and indeed I must candidly confess my utter inability to attempt any explanation, recommended by the slightest shadow of probability, why the ordinary causes of fever should at that time have assumed so unusual a degree of virulence†.

* The complete immunity enjoyed by Montserrat, St. Kitts, and other mountainous islands, even during an uninterrupted communication with us while suffering so deeply, cannot but obtrude itself as a proof of the marshy origin of this fever and its non-contagious nature. Point au Pitre, Guadaloupe, was sickly, but we know that part abounds in swamps, although the island is generally composed of elevated ground.

† About the months of September and October the heat was oppressive, but that was after the epidemic had established itself, and even then not more so, I am convinced, than we have lately experienced it without any corresponding pernicious consequences.

The only observation we made which I think worthy of notice was, that after each day of rain, the crop of cases (if I may so express myself) immediately succeeding, was more numerous and seemed marked with greater severity than before: a fact, however, not difficult to be accounted for. A sharp gale, almost amounting to a hurricane, blew from the eastward in September, which we were inclined to hope might work some salutary change in the atmosphere; but no benefit whatever was derived from it: the cases continued to occur as if nothing of the kind had happened.

I had certainly intended, previously to the commencement of this communication, to enlarge more than I shall now be able to do on the symptoms and mode of treatment, for I must be brief in order that this may reach you before your departure for England.

The general appearances, as they presented themselves here, answered pretty nearly to the description given by Bancroft and others, not excluding Mr. Pym. The mode of attack, however, (although precisely as described by those authors in by far the majority of patients) presented occasional varieties. I have already shewn that the disease sometimes commenced as an intermittent. In a few rare instances, where the blood was evidently and forcibly impelled towards the head, we found the temperature of the extremities even below the

natural standard, while the countenance was flushed, with great heat about the upper parts of the body and intense pain across the brow.

In the mate of a vessel trading here we counted on our first visit the pulse as low as 44, but full, with the above described symptoms. We almost fancied this unusual slowness might be constitutional; but on opening a vein it gradually increased in frequency, and after the loss of a considerable quantity of blood it numbered 80, with nearly complete relief from every uneasy sensation. Sometimes a chilly feel would accompany the attack throughout its whole course, altogether precluding the use of the cold affusion; for although the heat as indicated by the thermometer was obviously and generally increased, still to keep themselves at all comfortable the patients would, if they could be by any means procured, load themselves with bed-clothes, notwithstanding every direction to the contrary. Our experience led us to consider this an unpromising omen. Hæmorrhages were frequent from the nose, mouth, and anus; but petechiæ or vibices we never met with or heard of. Hiccough proved a mortal indication in every case where it fell under my observation*, and (besides

* I once, however, saw it occur in a manner as purely accidental as if the patient had been in health. I say accidental, for it was only 18 hours from the first attack, when the violent symptoms had obviously yielded to the lancet, and did not last above a couple of minutes. The circumstance, nevertheless, gave me

the infant formerly mentioned) I never knew but one individual survive that dreadful prognostic black vomit, and he had laboured under the remittent form of the disease with deep bilious suffusion. The unaccountable quantity of these dark fluids thrown up, as compared with those taken into the stomach, was a source of great astonishment to me. I have seen this deadly symptom come on as early as the commencement of the third day, although the patient has survived to the fifth; and within forty-eight hours, when the third has terminated his sufferings, I have discovered its incipient traces in matter thrown up, where the stomach had retained till that moment every thing that had been swallowed, and no burning sensation had been complained of as preceding it: indeed, this last, although it sometimes did happen, was by no means so prominent as I expected to find it from the descriptions of writers. I have known the black vomit, when it shewed itself early, apparently intermit, nothing coming up for hours but the medicines and nourishment taken, and not unfrequently it entirely ceased, the stomach retaining every thing for some time before death. A wedgelike sensation at the cardia, or as many themselves described it, "as if a marble were sticking there," always excited the utmost apprehension of the approach of this symptom. Eva-

great alarm; nor could I divest myself of the idea that the case would turn out ill for a considerable time.

cuations similar in appearance seldom occurred without corresponding black vomiting; once, however, they did to a remarkable degree, but the patient survived them*.

Recoveries were most rapid and indeed singularly so, after the concentrated or continued form, but sometimes (as was illustrated in my friend and partner's case, Dr. Daniell,) extremely tedious in the remittent.

We never met with what could strictly be called a relapse but once. It happened with a sailor who had imprudently exposed himself to the sun, and resumed the immoderate use of spirituous liquors before his strength was nearly recruited, and proved fatal with black vomit in four and twenty hours from the time he again felt himself unwell. Visceral obstructions as a consequence, as far as we have yet been able to ascertain, have been extremely rare, I may almost say unheard of.

As for the treatment, I sincerely trust all differences of opinion on this head, at least as far as regards the earlier stages, will speedily cease. The man who wishes to save his patient must act with decision, or he will fail in his object. He must

* An unusual velocity in the pulse, as when it numbered for instance any thing exceeding 130, either in the commencement, but more particularly in the progress of the disease, augured in general a melancholy result.

bleed—but he must bleed early, from a large orifice, and till some manifest change is produced in the circulating system. I have not unfrequently gone to the bedside of a patient, found him with hot skin, flushed face, parched tongue, intense headach, &c. and have not long afterwards quitted him perfectly cool and free from all uneasiness, and the symptoms have never recurred. But while the practitioner can scarcely err in the extent of his first bleeding, when his subject is plethoric and recently attacked, nothing requires greater judgment and more careful deliberation than the frequent repetition of this evacuation, or than its adoption at all at the more advanced stages of the disease. An error committed here may prove productive of irreparable mischief, and I would therefore hold it a safe rule in doubtful cases, to be cautious with the lancet after the first four and twenty hours, and to throw it aside altogether after eight and forty have elapsed. But in the commencement when a vein is opened, let not imaginary dangers induce us too hastily to close it; for if they do, we shall have debilitated our patient without affording him any actual relief. We have repeatedly with success taken upwards of forty ounces of blood at one bleeding. With equal success, in several cases, we have renewed the bleeding up to the third and even the fourth time; but, generally speaking, those which require such reiterated evacuation, evince an obstinacy not likely to admit of a favourable result under any mode of

treatment. It must also be remembered, that every one who applies for assistance is not alike able to bear this liberal depletion. Those of spare habits and with constitutions long assimilated to the climate; persons addicted to the immoderate use of spirituous liquors, and children, we found for the most part improper subjects for such treatment, indeed with them it was not equally called for. But general rules are ever likely to mislead. In all cases, therefore, where the propriety of bleeding is doubtful, either from the advanced stage of the disease or the habit of the patient, the practitioner must rely solely on his own judgment, carefully comparing the symptoms and calculating the chances of success likely to result from his determination for or against it. Sometimes of two evils we shall be induced to choose the least, and rather adhere to the adage, "*remedium anceps potius quam nullum*," than allow the symptoms to hurry on our patient to certain destruction. The exhibition of purgatives is subject nearly to the same restrictions as the use of the lancet. In our practice, the bowels were always freely evacuated by calomel and jalap or some other active medicine in the first instance, and were kept soluble during the whole progress of the fever. But I think I have seen the fatal event accelerated, where, from an over anxiety in this respect, medicines too harsh were administered at a late period, by which the most debilitating catharsis has been induced, not to be checked by any means that could be devised.

The cold affusion we employed more extensively at the commencement than at the close of the epidemic. At first we used to continue it every hour for a considerable time, but we found that its marked effects were not to be expected after a certain period, and that the fatigue caused by the constant exertion more than counterbalanced the advantages derived. Latterly, therefore, after five or six trials we laid it aside for cold ablutions, which were unremittingly persevered in, except where a distressing chilliness absolutely forbade it. When this occurred only to a slight degree, we substituted with benefit tepid for cold water. Bark we always found a most valuable medicine, but chiefly where it was early exhibited. As soon as the circulating mass is lessened, and the intestines fully emptied, its administration ought to be commenced. If we longer delay, if we wait for a marked remission, the foundation of the very mischief we wish to avert will have been laid. The stomach will reject it, and we shall be constrained altogether to relinquish its use; for it must be evident that no benefit can be derived from continuing a remedy which only tends to irritate an organ, whose state so materially influences the result. The powder should be first attempted, but in the event of its oppressing the stomach from its bulk, the combination of serpentaria with it in infusion, adding a proportion of the sp. æth. nitros. was generally an admirable form of prescription. Blisters proved useful auxiliaries in affections of the head, irri-

tability of stomach, and in the last stages more extensively as stimulants. When used from the first cause, we thought they produced a better effect applied to the nape of the neck and occiput, keeping the rest of the head closely shaved and covered with cloths wet with the coldest lotions. I could not avoid remarking, that no individual died in whom strangury had supervened on their use; and I have since understood that the most beneficial power has been lately ascribed to them depending on the absorption of the cantharides. Emetics and antimonials we considered out of the question.

Of the mercurial treatment, as it regards its specific effect, I can give you but little information. Although calomel entered largely into the composition of all our purgative prescriptions, we never ordered it with any particular view to salivation till a late period of the epidemic, after we had heard its efficacy very much extolled by some medical friends (attached to the army and navy) of whose judgment and abilities we entertained the highest opinion. Many cases were then successfully treated under its use, but as we never allowed it to interfere with what we ourselves chiefly relied on—the depletory system on the first accession—we could not of course ascribe the success solely to its operation. On one occasion, after having used the lancet twice to a great extent, we began

to pour in calomel. On the commencement of the third day, (before any obviously bad symptoms were observed,) the gums were evidently affected; yet, notwithstanding this, the stomach became irritable—the matter thrown up gradually became black—the ptyalism bloody and profuse, and the patient died on the fifth day. This case was as late as February, and occurred in the wife of an officer of the First West India Regiment. She was pregnant, however, and had been only a few weeks in the climate—both of these circumstances peculiarly unfavourable to any mode of treatment. In the remittent form, where bleeding has not produced the wished for effect of giving an immediate check to the progress of the symptoms, I think I have observed the greatest advantage derived from its employment; and I have satisfied myself of the slighter degree of irritation caused both to the stomach and bowels by large, than by more minute doses of calomel. Fifteen grains or a scruple may be given with perfect safety, and the dose repeated every four or six hours, the practitioner of course watching the effect and acting accordingly. I not very long since prescribed the first quantity four times in eighteen hours, with the production of only two or three bilious evacuations, without griping or any unpleasant effect. The mouth became touched, however, and I omitted any further repetition of the medicine. The saline mixtures, both still and

effervescing, the carbonate of ammonia, the whole class of stimulants in the last stage, and all the minor remedies which we had recourse to in order to obviate particular symptoms, or rather to appear not to neglect our patient, I shall not detain you by separately enumerating, but hasten to conclude this letter, which I fear has been already protracted to an unprofitable length*. By practice such as I have thus cursorily described, Dr. Daniell and myself lost not above one, on an average, out of ten who fell under our care. But as it is not my object to mislead, I am anxious to be distinctly understood. I do not pretend to assert that this was the proportion afforded by the whole mass of cases we were called to, of every nature, and at every stage. Certainly not: I except the instances I have described at first entering the Rat Island Hospital at so advanced a period, and all similar ones. I also exclude those in which we attended in consultation only, for while I must acquit myself of the slightest intention to reflect on my professional brethren, it must be obvious that those, in which extraordinary assistance is called for, are usually already discovered to be the most

* By breaking up small pippins in rum, and applying them to the region of the stomach, vomiting was sometimes subdued without having recourse to a regular blister; and as an internal means of checking this symptom, nothing answered better than fifteen or twenty drops of laudanum, with half a teaspoonful of calcined magnesia, in a wineglassful of mint tea.

obstinate and unpromising in each man's practice. But I repeat that, on a review of those which presented themselves in time for the due exhibition of the means I have enumerated, our success was fully equal to what we claim.

St. John's, Antigua, June 7th, 1817.

EXPERIMENTS AND OBSERVATIONS

ON THE

U N I O N

OF

FRACTURED BONES.

By JOHN HOWSHIP, Esq.

Read March 17, 1817.

IN conformity with the plan originally proposed, I should now take up the consideration of the particular circumstances under which new bone is produced in necrosis, together with the structure of the ossific fabric so produced, compared with that of the original bone ; and with a view to this part of the subject I have made the necessary examinations, and collected the illustrations. But upon reflection it appears improper to separate the consideration of the structure of the bone, from that of the other circumstances connected with its formation ; the whole forms a sort of circle, each part being essential to the rest. I shall therefore pass on for the present to the investigation of the means by which union is effected in fracture.

In the prosecution of this inquiry it affords me much pleasure to acknowledge the continued kindness with which Mr. Heaviside has favoured my progress ; neither can I pass over in entire silence the numerous marks of friendship with which I have been honoured by Dr. Hooper, who on this and every other occasion has afforded me the most liberal assistance ; ever happy to forward the progress of scientific inquiry, he has kindly allowed me to avail myself of many valuable and interesting specimens of diseased bones, which form a part of his own exceedingly select, though extensive, collection of preparations in morbid anatomy.

Unfortunately, however, the information to be derived even from the best preparations is of a very limited nature. They demonstrate the exact condition of parts at a certain point of time, but without unfolding the successive steps previously necessary to such condition.

The circumstances connected with fracture so seldom bring life into danger, that opportunities of observing the progress of union in the human subject rarely occur ; and in comparative experiments those animals have been generally selected, in which the successive steps of the process are conducted upon so minute a scale, that unless the investigation were carried on with the assistance of the microscope, it seems to me scarcely possible it should ever lead to any satisfactory result. Upon

this ground only can be explained the diversity of opinion that has existed with relation to the seat and mode of production of the callus, the uniting medium in fracture.

Some anatomical writers of the present day, it is true, have chosen to talk with much more confidence upon this question than ever Mr. Hunter ventured to do; but upon comparing their assertions with the results of those inquiries I now have the honour to submit to the Society, it may perhaps appear that their opinions are rather ingenious than just. We must not, in reasoning upon the operations of nature, speak with so absolute a tone as to imply our being in complete possession of all her secret walks, many of which are still unknown.

In the following essay it is proposed, first, to detail the successive steps that have led me through the inquiry, pointing out the observations as they occurred; secondly, to notice the opinions formed by Haller and Hunter upon this subject; and lastly, to lay before the Society the conclusions drawn from my experiments.

The following experiments were made upon rabbits, selected at about the age of twelve months, the period at which, from their beginning to bear young, they may be considered to have nearly attained their full growth.

I. My first examination took place in a rabbit, the left femur of which had been fractured. The animal was killed, and the limb filled with fine injection upon the third day. On dissection, the extravasated blood was found pretty extensively diffused through the cellular membrane between the muscles, and even beneath the integuments, as well as in the immediate seat of the fracture. It seemed at first that the effused blood had in various points received the injection; but minute examination by the microscope ascertained that the injected vessels were only those scattered over the fine transparent lamina of the ecchymosed cellular membrane.

A considerable space or sac, within which lay the broken ends of the bone, was filled with a coagulum of blood, the consistence of which was peculiar, not having even a uniform appearance. In some points the adhesion of this coagulum to the bone was much stronger than in others; in colour, the internal part was of a florid red, the external surface being as dark as venous blood.

The periosteum in the neighbourhood of the fracture was so completely charged with the effused blood, that the altered state of the membrane, and the close adhesion to the bone of that which was evidently coagulum only, rendered it at some points extremely difficult to say which was, and which was not, periosteum.

The injection had been very successful, but the vermilion could not be detected at any point passing into the coagulated blood, although the abundance of injected arteries proved that the nearer the seat of the injury, the more active was the circulation.

The fractured ends of the bone were found closed up by a small coagulum of blood deposited just within the opening of the medullary cavity.

The bone was now dissected out, divided longitudinally with a saw, and while immersed in water the soft contents of the medullary canal were lightly swept out by means of a fine camel-hair pencil. It was thus ascertained, that the coagulum divided in sawing through the bone was so firmly adherent to the opening of the cylinder, that while the pencil washed out at once the medullary contents, the coagulum remained firm, and could not be detached even by rough brushing. This adhesion did not appear to be the consequence of vessels shooting into the coagulum; for several parts of the large external mass of coagulum were adherent with the same degree of firmness to the fractured ends of the femur, where the bone is not covered by any membrane, and is of too compact a texture to have admitted of much vascular intercourse.

Upon the membrane lining the medullary canal

the small arteries approaching the margin of the coagulum were numerous and brilliant, but I was not able to trace a single injected vessel shooting into the substance of the coagulum.

II. The second examination took place on the fifth day, after fracture. The vascularity of all the coagula, or rather of the membranous expansions containing them, was astonishingly great, particularly in the large coagulum between the broken ends of the femur. At certain points the bright masses of injected vessels had the appearance of pure vermillion extravasated; but on examining them with the microscope, the arteries, although innumerable, were found to be entire, and everywhere perfectly distinct.

The bone was divided longitudinally, and while immersed in clear water, the medullary contents were brushed out, as before; the injected vessels by this means exposed upon the membrane lining the cavity were found to be much more numerous than in the former examination. The small coagula within the openings at the fractured ends of the bone, were surrounded towards the inside by the most numerous plexus of vessels that can be conceived. The appearance of the cavity of the cylinder near the line of attachment of the coagulum was that of pure vermillion, but on inspection in the microscope the vessels were all found entire; neither at this period could I distinctly

say that any of the injected arteries had passed into the coagulum.

The superior extremity of the fractured bone was subsequently macerated and dried, when it was ascertained that where the broken ends of the bone had rode over each other, the vascular excitement in the periosteum had already manifested itself by the commencement of ossific secretion. The appearance was that of a slight roughness upon the surface, not very perceptible to the naked eye, though perfectly distinct when magnified. It was the result of a regularly circumscribed action, and had the appearance of uneven lines of a rough white substance, laid at intervals upon the brownish smooth surface of the original bone.

III. The third examination was on the ninth day; and in this, as well as in each of the subsequent examinations, the inquiry was conducted with particular care. The appearances observed in the successive stages of the dissections were preserved by sketches made at the moment, with such notes as might best explain the state of the parts. Numerous thin sections were removed, and laid on glasses for the microscope; the glasses being numbered, and tracings of each section preserved, with notes of the recent texture and relation of every part, and references to the outlines made at the commencement of the dissection.

The subsequent treatment of the macerated and calcined parts was conducted with the same caution; and this patient and close attention proved indispensable, for no other mode could have enabled me to trace with perfect accuracy the nature of any particular appearance, it furnished a clue which might be traced backward or forward through all the curious gradations of advance after the dissection was finished; and I trust the Society will forgive any apparent minuteness of detail, as my principal anxiety is to bring forward nothing fanciful, nor any thing but what I have myself distinctly seen, and which may also be seen by others, either by repeating my experiments, or consulting the annexed illustrations.

In the examination upon the ninth day, the periosteum, which in the former dissections had been found much thickened from effused blood, was now greatly altered. The increased volume of the membrane, indeed, was the same, the section in some parts being one-fourth of an inch in thickness; but the whole of the colouring matter of the blood was gone, the divided membrane displaying a very curious structure. The colour was a transparent pearly hue, rendered beautifully luminous by the refraction of colour from innumerable injected vessels shooting obliquely through from its external surface down towards the bone. In general consistence it cut smooth, and about

the firmness of stiff jelly. In most parts this altered periosteum very nearly resembled cartilage, though softer and more elastic; but in those points where the two broken ends of the bone lay across each other, the membrane had acquired more firmness and opacity, approaching more closely to the nature of true cartilage.

The recent sections of this thickened periosteum examined with the point of a needle under the microscope, could not possibly be distinguished from cartilage. The uniform areolated texture seen by a transmitted light, answered exactly to that of originally formed cartilage, and to that only; and when a part of the section was gently moved by the needle in the microscope, it was observed to possess the same freedom of expansion and contraction as cartilage, only in a much higher degree.

Within the fractured end of the lower part of the bone the coagulum was pale and colourless; neither was there upon its external surface any trace of injected vessels. Finding, however, a little bit of the edge of the cylinder fractured and loose, I gently raised it up, and then perceived that the internal part of the coagulum had not yet lost its red colour. On examination in the microscope, the red part of the coagulum, or that lodged in the cells of the membrane within the

medullary cavity, was found to be abundantly crowded with injected vessels*.

The femur was next dissected out and dried, and one part of it being divided longitudinally and calcined, was prepared for examination by the solar microscope.

In the course of these operations the progress of ossification was rendered apparent. This process externally had advanced into the cartilaginous periosteum, so as to produce at certain points a considerable elevation of surface; and within the mouth of the cylinder the commencement of the same action was manifest, although apparently established upon a somewhat different principle. The external or superficial deposit had taken place into the substance of the altered periosteum, while internally bone was forming within the substance

*. In repeating the ninth day examination in another rabbit, the same plenitude of injected vessels upon the ecchymosed membrane lining the medullary cavity, previous to the disappearance of the red globules, and the same almost total absence of injected vessels in the pale external part of the coagulum, were equally obvious.

A part of the femur, however, laid aside to shew the contrast between the recent and dried state of the injected coagulum, exhibited in the microscope the external surface of the coagulum, or at least that of the incipient ossification within it, plentifully supplied with vessels, the fine extremities of which were filled with injection.

of the coagulum closing the opening of the medullary cavity ; and from this latter change having commenced in parts where the coagulum was still red, it is fair to infer, that although the removal of the colouring matter of the blood may be expedient, it is by no means essential, to the commencement of ossification. The ossific deposit upon the outside of the cylinder was a light cellular or cancellated structure, very far exceeded, however, in the delicacy of its texture by that produced from the inner margin of the medullary cavity*.

IV. The fourth examination took place upon

* In a most interesting paper lately read to the Royal Society by Sir Everard Home, the great extent and high importance of whose labours in physiology are well known to the professional world, some exceedingly curious circumstances are noticed with regard to the progressive organization of a coagulum of blood. If a drop of blood placed in a watch-glass is observed in the act of coagulating, air is disengaged in minute globules which presently form numerous canals, and these connecting themselves to each other are very soon seen to pervade the whole substance of the coagulum, a change which the author considers the first step to organization. The peculiar appearance of the ossific fibres which I have myself observed formed within the coagulum in the cylindrical cavity of a fractured bone, renders it probable that the new bone is deposited in the tubular spaces, the existence of which has been thus ascertained by Sir E. Home, although the object of my inquiry being limited, the structure of the pure coagulum was not examined with sufficient care to enable me to detect these canals, presuming them to have existed.

the fifteenth day. The ends of the bone had in this and almost every other instance rode over each other, notwithstanding my having tried almost every possible expedient to prevent motion by the application of splints and bandages.

In the present instance, a small rounded tumor, particularly prominent upon the inside of the thigh, had remained in the site of the fracture. On dissection I found a very tense strong membranous cyst, crowded with injected vessels passing into it from the surrounding parts. On puncturing this cyst, some thin fluid blood escaped, and the sac collapsed. The opening being enlarged exposed rather a large cavity, the parietes of which were of a dark colour from effused blood diffused through its cellular texture.

Within this sac lay the lower end of the upper part of the femur, which, although projecting into the cavity of the sac, was covered up to the very margin of the fracture by an exceedingly fine membrane, the vascularity of which was beautiful and brilliant beyond description. The finely injected arteries were also seen passing in every direction over the surface and into the substance of the small coagula deposited in the cellular structure of the sac.

Just behind the sac, the upper end of the lower

part of the bone was found laying obliquely against the superior portion. At this point an extensive line of union was formed. The two parts of the bone were connected together by a pretty firm cartilaginous state of periosteum, within which ossification was advancing rapidly.

The parts of the femur were next removed, and as in the former instances macerated, divided, calcined, and so prepared for the microscope. By these means the appearances were rendered very distinct. The external or superficial deposit had now become a considerable mass of bone; but the most curious appearance was that of the new structure in the opening of the medullary cavity. More than half this space was filled with the most exquisitely delicate cancellated texture, the apparently fibrous arrangement of which was gently inclined inwards to the centre of the cavity*.

V. In the fifth examination, which took place upon the twenty-third day, the parts of the femur were found on dissection united obliquely, but with considerable firmness; although a degree of motion just perceptible might still be produced between the two parts of the bone. The fractured ends of the femur were found covered with a considerable quantity of new bone forming an irregu-

* See Figures 1 and 2.

lar tumor, covered externally with a well-injected membrane, or periosteum. The appearance and texture of this membrane in most points exactly resembled the original periosteum; but in parts where it had not yet entirely laid aside its lately assumed function it was still thickened, soft, opake, and pulpy. In one part in particular, where ossification was advancing rapidly, I met with a circumscribed portion of cartilage, more firm in its consistence than what had been observed in any preceding examination. The opposed surfaces of the new ossification were in most points nearly in contact, and were apparently connected together by a ligamentous or strong membranous medium; the small piece of cartilage, however, attracted the most particular attention. In shape it fitted into a space, so as to exactly make up the general external figure of the bone; in consistence it was the only specimen I had yet seen that exactly resembled originally formed cartilage; and in its structure it was no less interesting, for it was on examination in the microscope discovered to contain mucous cavities lined with vascular membranes, a peculiarity of organization demonstrated in a former paper to belong exclusively to cartilage connected with ossification.

In effecting a separation between the two extremities of the femur, the abovementioned cartilage was divided, and several thin sections of it laid

upon glass were examined. The fourth section reached the surface of ossification, a part of which was brought away with the next slice. All these specimens were examined while recent in the microscope; and that which exhibited the best illustration was selected for a drawing by the solar microscope, affording a demonstration of the occasional existence of membranes capable of being injected within cavities in new-formed cartilage, together with the appearance both of surface and structure of the recently deposited bone*.

The two parts of the femur were dried, divided, calcined, and the sections subsequently reduced to smooth surfaces, to expose the exact appearance of the minute structure.

The section of the upper part of the femur exhibited upon the one side a very extensive and copious deposit of ossific matter, and upon the other the substance of that mass of new bone, the surface of which had been removed with the sections of the cartilage; while upon the inside of the bone the nearly completed work of ossification was seen, as carried on within the coagulum of blood. That part of the substance of the femur also, upon which the new deposit had taken place, exhibited very beautifully the commencement of interstitial absorption, affording in this respect an

* See Fig. 3.

interesting parallel to the same process, lately in the human subject*.

In the present and most of the other examinations, it appeared that the external ossific action in uniting a fracture, does not commence at the nearest point of contact between the two parts of the bone, but on either side near to that point. This circumstance will be clearly perceived by reference to the annexed figure†.

VI. The sixth and last examination took place upon the thirty-second day. Upon removing the soft parts, the bone was found to have been broken in two places; and in both parts the fracture was oblique. One of these had become completely united, with considerable exuberance of callus; the other had formed two broad surfaces of contact, capable of motion, and was in fact an artificial joint. The more particular circumstances of this appearance I have already adverted to in a note attached to my last paper‡.

The projecting parts of the new and of the old structure were covered with an equal, distinct, but scarcely thickened periosteum; not particularly vascular, although many of its smaller arteries

* See Med. Chir. Trans. Vol. VIII. p. 524.

† See Figures 4 and 5.

‡ In the note referred to, for 23rd day read 32nd day.

were found injected. In several points a large artery was traced, passing into the new work, giving force and activity to the recently established circulation.

The united part of the bone was divided with a saw, and when calcined, its minute texture was seen more clearly; but the specimen was with difficulty made to bear the action of the file, the only means adequate to the complete display of its structure. A small part of the piece was, in preparing, unavoidably broken off and lost, but fortunately every feature of importance was still retained. The drawing produced from this specimen by the solar microscope proved extremely interesting. It afforded a striking demonstration of the ease with which nature works, the readiness with which every instrument fulfils its appointed purpose, and the facility with which the various modes of a commencing operation may become one and the same process in her hand. It exhibits the ultimate result of the differently situated appearances of ossification above noticed, within the cartilaginous periosteum, within the ecchymosed texture of the membrane lining the medullary cavity of the bone, and also within the substance of a coagulum of blood. The whole becomes one, and the little peculiarities observed in the early appearances of the various parts of the work being now lost, the general structure exhibits a light, uni-

form, extended fabric, every day increasing in compactness and solidity.

The present specimen also affords a demonstration of a fact which the natural force of Mr. Hunter's genius led him to perceive; and Sir E. Home has kindly referred me to a preparation illustrating the fact in the Hunterian Museum; although Mr. Hunter did not possess the means of proving it in its full extent, by the examination of its minute structure. The circumstance now alluded to, is the occasional preservation of the living principle in detached fragments of bone. In the present instance, a piece of bone so situated is fortunately preserved*, and is seen laying obliquely across where it must have been left completely detached in the

* I say fortunately preserved, because in two other instances of a similar appearance, the operation of the file in passing over the more compact substance of the fragment, loosened it from its connections, and it was lost. The preservation of the present specimen was owing to the following unforeseen accident. In burning the bone, the fire being dull, I chose to urge it by a gentle stream of air from a pair of bellows. The specimen, when cooled, was laid down and fixed as usual, but was found to resist the file almost as perfectly as if vitrified; and it required more than two hours to bring down the surfaces even partially to the same plane. This excessive hardening of the bone had operated of course most completely upon the fine cancellated parts, the solid substance of the original bone having comparatively escaped, the detached portion, consequently, cut like chalk, being held fast by the surrounding light structure.

midst of the blood effused at the time of the fracture. From the obvious change in the figure of some of its longitudinal canals it appears, that subsequent to the injury, the circulation and other functions of the membranes within the canals had been resumed, and healthy action re-established*.

Having now completed the series of comparative examinations, I shall next state what I have observed as to the structure of callus, in the human subject.

An instance of fractured femur, mentioned in my Observations in Surgery, furnished a favourable opportunity for inquiry, the history of the case being known†. I therefore removed a section from the bone, capable of demonstrating the structure of the callus, contrasted with that of the cylinder of the femur. This piece, prepared in the usual manner, was examined in the microscope; previous to which it was observed, that the heat in calcination had produced a greater degree of contraction in the new than in the old bone, so that the section of the new bone had become shorter than that of the original cylinder upon which it was deposited.

In the microscope, the obvious contrast between the structure of the new and old bone, evinced by

* See Fig. 6.

† Case 107.

the disposition and figure of the canals pervading each, was so strong as to prevent any uncertainty in defining the line of separation. The appearance of the original longitudinal canals has been already described; but the irregular cavities within the new deposit, as well as the uncertain figure and direction of the canals of communication, bore no resemblance to them, although in point of number they were sufficiently abundant to keep the whole mass still within the controul of the active agents, as completely as in bones of original formation*.

To determine whether the primary structure of the original bone was as it were accepted, and allowed to stand, in the communication established with the new work, I made a section passing completely through the fractured bone, and selecting a part of the surface of the section where the cylinder of the femur obviously terminated in a surrounding bed of the new deposit, a thin plate was removed, and when prepared, an exact drawing was taken from it by the solar microscope. The annexed figure will afford the best illustration of the exact appearance, exhibiting the contrast between the minute organization of the new, and that of the old bone†.

Such are the circumstances, as far as I have

* See Fig. 7.

† See Fig. 8.

hitherto been enabled to trace them, relating to the process of union in simple fracture; but it is a fact no less curious than interesting, that from the intervention of peculiar circumstances, as in cases of compound fractures, the order of progression is changed, new actions arise, and new appearances result; and the manner in which these changes occur, serves to throw much additional light upon the source from whence these actions originally spring.

In these cases, as in simple fracture, there is a deposit of ossific matter, sometimes in considerable abundance; but this is not the only consequence of the excitement. Absorption of bone takes place, and that to a variable and sometimes very free extent. In fact, the whole series of appearances may be observed verging towards the process established in necrosis, affording a strong indication that the principle determining the nature, and regulating the tendency of every action set up in the animal economy, is no other than the peculiar exigency of the case, the peculiar combination of circumstances rendering any particular change, or series of changes, necessary*.

* These remarks have been principally suggested by some interesting specimens of bone diseased from gunshot wound and fracture, which were sent to Mr. Heaviside from the seat of war, subsequent to the memorable battle of Waterloo, by Mr. Dorritt. In one of these cases, several large pieces of bone, one of them five inches in length, were removed from the femur, three months

I shall now proceed to notice the opinion that others have entertained upon this subject.

after it had been fractured by a musket-ball which passed nearly through the limb. The constitution sinking under increased irritation, was the motive for laying open the wound and searching for the fragments of bone. The patient recovered. Upon some part of the external surface of each of these pieces a superficial deposit has taken place, and the examination of these specimens affords abundant proof that the seat of this deposit is in some cases entirely the cellular texture of the periosteum; for the new work and the old bone were evidently separated by the inner lamina of the membrane, the points of attachment between the new and old bone being few in number. Upon the largest piece the superficial deposit is nearly as thin as paper, and at one part a scale, the eighth part of an inch in length, was quite detached from the body of the bone in macerating, although it still remained entire in itself; clearly shewing that its situation must have been within the periosteum. The state of the bone also demonstrates that the inner lamina of the periosteum had not remained inactive beneath the new deposit, but had become towards the old bone a granulated and absorbing surface, which had already removed a sufficient quantity of the substance of the bone to prove the agency, as well as identify the instrument. The extent of the boundary line of absorption, generally speaking, was found to exceed that of the depositing or ossific action. At various points the contents of the longitudinal canals, immediately beneath the external surface of the bone, have manifestly participated in the excitement, and have evidently been at work, aiding the removal of the fractured portions of the bone.

In another of the specimens, all of which are valuable from the particulars of the cases being attached to them, several pieces of the fractured femur, from a patient who died two months after the receipt of the wound, have become fixed to the shaft of the bone by a copious deposit of ossific matter, the seat of which had principally been the periosteum; although in some points it was evident that the new bone had been secreted into
coagula

Haller, in describing this process, says, “*Cal-
lus et ipse ossis est imitamentum ; gluten nempe
ex ruptis vasculis et fibris ossis fracti, vasisque la-
ceræ medullæ, exsudans, quod sponte consistit,
et in cartilaginem abit, ut etiam ex naturæ ordine,
ex eodem glutine, cartilago formatur. Idem de-
mum ossescit, quando vasa habet satis dilatata, ut
sanguis ruber in eum penetrare, et secum terreum
succum advehere queat. Ea tunc terra in puncta
ossea, quæ rubia rubro colore tingit, effunditur,
quorum singulum abit in nucleum osseum, qui
vasa recipit, et emittit, quoad cartilaginem omnem
eliserit, ut sola natura ossea supersit** ;” in which
he mentions the formation of distinct points or
centres of ossification within the newly formed
cartilage. The description is certainly beautiful ;
but if in point of accuracy it were no more to be
depended upon than that which follows in the
next page, where he states that, “*Omnibus com-
mune est, gelu esse in principio, tunc cartilaginem,
inde in medio anulum oriri, qui primus ossescit,
et qui paulatim excrescens, cum ossea natura,*

coagula of blood. One of the pieces of fractured bone I care-
fully divided with a small fine saw, and found that the thickness
of the superficial deposit was on the average one-sixteenth of an
inch, while the extent of the space beneath, occupied by the
inner lamina of the periosteum, was equal to one-eighth of an
inch. The longitudinal canals near the external surface of the
bone were enlarged in this, as well as in the other specimens.

* Vide *Elementa Physiologiæ Corporis Humani*. Tom. VIII.
page 334.

versus epiphyses extenditur, et cedentem sibi naturam cartilagineam denique in crustam tenuem elidit," his testimony alone should be received with some caution, as I have myself disproved the latter of these two positions, in the observations contained in my paper upon the formation of bone, and as with regard to the former, I found no distinct appearances in support of it in the course of my experiments upon fracture*.

* It is rather curious that so eminent a physiologist as Haller certainly was, should not have been aware that the deposition of bone precedes the evolution of cartilage; a mistake which every succeeding anatomist up to the present day seems to have copied from him, as all have alike fallen into it.

The examination upon which I made out this fact, was only partially entered into in my paper on the formation of bone, from a desire to avoid what appeared to be unnecessary detail. The human embryo at the eighth week was not only examined as to the state of ossification in the limbs; but the ribs were cut away from each side with a pair of scissors, and the soft mass of the vertebral column was divided across in the middle, and the upper half placed with its inside, the lower with its outside to a narrow slip of glass, was examined, and then laid to dry. A very exact drawing was taken from this specimen in the solar microscope, exhibiting the minute centres of ossification for the bodies of the vertebræ laid at regular distances from each other, and answering in their comparative sizes to those of the future bones; the dorsal becoming larger towards the lumbar, and these again being quickly reduced to the smallest conceivable point at the apex of the sacrum.

On the posterior part of the spine, the rudiments of the processes that pass laterally from the bodies of the vertebræ to unite in the future spinous processes were laid in pairs, very distinctly formed. It is remarkable that between every two of the ossific
points

Mr. Hunter, however, who may be considered to have depended almost exclusively upon what he had himself seen, has given the following account of the union of fractured bone, in his lectures. “The space between the broken surfaces of the bones and the surrounding parts, is at first filled with extravasated blood from the ruptured

points of the vertebral column several elevated lines were apparent, connected with the surface of each ossific nucleus, and evidently of a more firm consistence than the rest of the gelatin, though not materially more opaque. These lines were considered to be the rudiments of the ligamentous texture enveloping the spine, and this opinion was strengthened by the close analogy between this appearance and that already demonstrated upon the first figure of my paper on the formation of bone, where the lines seen are in my mind unquestionably the rudiments of the tendons in the hand, deposited in the soft gelatinous matter.

The appearance of the vertebral fabric was exactly that which would have occurred, if so many particles of bone had been dropt into an even bed of thin warm glue, and allowed to dry. With the exception of the ligamentous appearance already noticed, no part was more elevated, or more firm than another; neither was there the least perceptible variation that could be detected in the microscope as to colour or shadow, either while recent, or when dried. Now it is well known that the above ossific nuclei exhibited within the cartilaginous bodies of the fetal spine, in a subsequent stage of its formation, produces one of the most beautiful preparations in anatomy; and as cartilage must, like all other substances, be allowed to possess its proper physical qualities, it must certainly be admitted that in the above examination of the spine and extremities, the rudiments of ossification were completely apparent in all parts of the body, without the least indication of cartilaginous developement, and consequently that the visible commencement of ossification precedes the formation of cartilage.

vessels. This first coagulates, and then becomes vascular. The ends of the bones are attacked with the adhesive inflammation, in consequence of which a new operation takes place in these parts. This inflammation which takes place, takes place equally in any detached parts called splinters, but such as are still attached to the soft surrounding parts, and to the bone. Such inflammation produces a disposition to interstitial absorption in them, so that these parts of the bone become softer than common, also an absorption of the angles and sharp edges takes place, in which the processes are taken off, and rendered smooth. They also become vascular, so that the parts fall back into their young state again, whenever they have to perform the operations peculiar to youth. I also believe that in most fractures there are some splinters detached, but they are kept alive still, provided they are not deprived of the living principle themselves, nor the surrounding parts deprived of it, and form a part of the callus. What makes me believe this is, that I seldom if ever examine a compound fracture where this does not take place. If I am right in this conjecture, then the union of the splinter is similar to the transplantation of teeth. If the laceration is great, they may increase the quantity of callus in proportion to the distances between the divided surface of the bones. This new formed substance is a nidus for the bone; it becomes more and more vascular, and firmer and firmer, till it becomes

cartilaginous, and while in the soft state it is in many places pressed by the surrounding parts, and often new moulded to the parts, as in fractures of the ribs. The ossific process begins at the original bones themselves, and extends into the callus, though the formation of bone begins in different parts of the callus, similar to epiphyses."

In the above account, Mr. Hunter considers that "the bones are attached with adhesive inflammation," an idea which is very well borne out by the state of the soft parts, and is nearly parallel to that of a late author, who observes that, "*S'il est permis de conjecturer, on peut croire que l'inflammation de l'os fait la condition essentielle de sa réunion, comme de celle de tous les organes**;" but from the observations I have made it would appear, that the state of the bones affords no support to this opinion, at least according to my mode of reasoning upon the subject; for it is demonstrated by the preceding experiments, that there is not the smallest degree of tumor or thickening of the sides of the bone, nor any material alteration in the organization or appearance of the longitudinal canals within the solid structure. Neither can I conceive that Mr. Hunter expressed accurately what he intended, in saying that "the bone becomes softer than common." It may from sub-

* Delpech. *Maladies Chirurgicales*. Tom. I. page 205.

sequent interstitial absorption become less capable of resisting the effects of pressure or violence ; but there is no ground for suspecting that fracture produces any change in the constituent principles, without which change the consistence of bone cannot vary.

Upon the whole, however, Mr. Hunter's account of the union of fracture is more accurate than any I have seen or heard of, and coincides exactly in many essential points with what I have myself ascertained by experiment*.

Having at length completed the account of my observations upon fracture, I shall now lay before the Society the conclusions drawn from the above enquiry, which will close the present paper.

The first effect of fracture is extravasation of blood into the surrounding soft parts, the quantity poured out varying according to the degree of contusion or complication. This blood is principally diffused through the cellular tissue of the periosteum, increasing its thickness after the manner of ecchymosis in the common cellular membrane ; a similar effusion takes place from the ves-

* In two instances I have had an opportunity of observing the circumstances that attend a deficiency of power in the constitution to unite a fractured bone ; but the consideration of these cases, with that of the treatment best adapted for their relief, I shall probably take up upon some future occasion.

sels within the medullary cavity, and a coagulum is deposited in each of its openings; there is also extravasated blood deposited between the fractured parts of the bone in larger or smaller quantity, according to circumstances. But although the smaller coagula in the openings of the medullary cavity, and the larger quantity of blood between the ends of the bone, were probably at the first continuous, they are readily distinguished in examination, the former being more tenacious and elastic, the latter retaining the properties of a common coagulum.

The blood effused in fracture suffers various degrees of change, regulated by its situation; but under all circumstances it forms the medium in which the ossific process is established. It may be observed that the blood soon coagulates, and that subsequently most of the colouring matter disappears, and it is probable that the greater freedom of circulation is the means of effecting these changes earlier and more completely in the blood deposited in the cellular tissue of the periosteum than elsewhere; although these circumstances do not materially influence the subsequent establishment of ossification.

When the colour disappears from the blood effused into the periosteum, the altered membrane becoming more firm assumes by degrees the characters of cartilage; and from its appearance under the microscope, as well as from its power of

facilitating ossification, it may be considered as having taken on all the properties of true cartilage.

The mode of progression in the ossific process seems to indicate a degree of caution, as if a principal object was to guard against the possibility of the least disturbance or motion between the parts of the bone, subsequent to the act of union. • We see that ossific matter is first deposited upon the surfaces of the bone, near those points where union is to take place; ossific matter is also secreted round the margin and within the medullary cavity of the bone; and the foundation being laid, the whole work advances from either side into the coagulum deposited between the two ends of the fracture, no point shooting forward beyond the rest, until an extended mass of bone is produced from the apposed surfaces; and while the two surfaces of the new work approach each other, the intermediate soft substance, the remains of the coagulum of blood, increases in compactness, as it diminishes in thickness, the seat of the fracture thus acquiring a remarkable degree of firmness previous to the actual accomplishment of ossific union.

The circumstances of the fracture evidently regulate the quantity and seats of the ossific deposit. In the simple transverse fracture with little contusion, where the bone is immediately reduced, and

the limb kept perfectly quiet, the degree of internal laceration will be small, the effusion of blood inconsiderable, and the ultimate deposit of bone moderate in proportion. Ossification, in this case, is established within each orifice of the broken bone, and also round the external margin, extending itself conformable to the freedom of the preceding effusion into the periosteum, to some distance above and below the seat of the fracture.

In oblique fracture, where the bones have suffered more violence at the moment of the accident, and are retained with more difficulty when reduced, the effusion of blood will be greater, and the quantity of ossific matter formed will be also more abundant. The appearances in the present case will be materially different from those observed in the former. In the transverse fracture the ossific matter is deposited equally, presenting a gentle elevation, extended above and below the line of the division. In the oblique fracture, however, the appearances are less uniform. An occasional degree of motion between the parts of the bone being with difficulty restrained, points of irritation are established, dependent on the circumstances of the accident; and while some parts of the cylinder are progressively covered with ossific matter, others are left naked and exposed. But in the oblique, as well as in the transverse fracture, a free secretion of ossific matter takes place within the medullary cavity, because in both cases a well

supported platform must be brought forward from each of the fractured ends of the bone.

Where, however, the fracture is not only oblique, but attended with extensive contusion, or comminution, the broken ends of the bone will generally ride considerably over each other, giving a new turn to every stage of the uniting process. The effusion of blood will be most conspicuous at certain points, at which points the subsequent changes and ultimate deposit of bone will also take the lead; and upon attentively considering the appearances in these cases it will be perceived, that the powers of the constitution seek to compensate the unfavourable state of the parts, by laying a broader foundation for repair, increasing the extent of the sphere of operation as far as may be necessary for the eventual union of the fragments, with the principal parts of the cylinder into a single bone again.

When the fracture is still further compounded by a wound communicating externally, the constitutional powers foiled in the endeavour to complete the process necessary to complete recovery, establish new actions, and while every exertion is made on the one hand to repair the injury by the abundant deposit of ossific matter, a manifest effort takes place on the other, to effect the removal of whatever parts of the bone may have entirely lost their circulation. This removal is at-

tempted either by the internal surface of the periosteum alone, which takes on a granulated and extremely vascular texture, possessing the power of absorption; or by this means, in conjunction with the soft contents of that portion of the bone which may not have suffered an entire suspension of its vital actions, in which case absorption is excited in the nearest longitudinal canals.

As to the composition of bone formed after fracture, from the constant disposition to crack and split off under calcination, where the new bone was external to the old, and from the uniform but great contraction in exposure to heat, where the new-formed bone was at liberty to contract, I have been led to conclude that the newly deposited bone certainly contains a larger proportion of animal matter than the original bone, and it is worthy of remark, that this character was very distinctly observed in callus examined several years subsequent to the date of its production*.

* This circumstance is curious, because it proves that nature adopts two standards for the composition of healthy bone; in the human subject; exhibiting in this respect a parallel to what I some time since (see Vol. VI. page 276.) demonstrated in birds; the bones of which, in their first formation, contain a very remarkable excess of animal matter, which excess I found disappeared upon the completion of growth, when the internal fabric of the bones is re-modelled, for the purpose of establishing the ~~alt-cells~~ and cancelli.

EXPLANATION OF THE PLATES.

PLATE III.

Fig. 1. Exhibits the femur of the rabbit on the fifteenth day after fracture; moderately magnified.

a a. The superficial deposit, or that formed within the periosteum.

b. The fine ossific texture forming within the coagulum, and advancing towards the centre of the opening in the medullary cavity.

Fig. 2. Unfolds more perfectly the extreme delicacy and fibrous appearance of the ossific structure deposited within the coagulum of blood, the image being very considerably magnified.

a. The section of the femur.

b. Section of the newly formed ossification.

c. The surface of the new work.

Fig. 3. Part of a section of new-formed cartilage, shewing its surface, and a partial section of the ossific deposit within it, on the twenty-third day after fracture.

- a a.* The cavities, with the injected vessels and membranes, within the substance of the newly formed cartilage.
- b b.* The surface of the new bone, full of foramina, as partially seen through the substance of the cartilage.
- c.* A section of the ossific structure, with several injected and divided vessels.

PLATE IV.

Fig. 4. Section of the upper part of the femur, examined on the twenty-third day after fracture.

- a.* The broken end of the bone.
- b.* The superficial deposit upon the upper side of the cylinder.
- c.* The corresponding deposit on that part of the bone from which the section of cartilage (*Fig. 3.*) was removed.

Fig. 5. The minute structure of *c.* upon the 4th Figure, unfolded by withdrawing the screen of the solar microscope further from the instrument, throwing at the same time a more intense light upon that particular part of the object.

- a a.* The solid side of the cylinder of the femur, shewing enlargement of the longitudinal canals.

- b.* The exquisitely delicate and minute texture of the new bone, seen very distinctly.

Fig. 6. Displays the ultimate and complete result of the process of union, although a part of the bone was broken off, in calcination.

a a. The two sides of the femur.

b b. The new bone formed within the cartilaginous periosteum, near the seat of the fracture.

c. That part of the ossific fabric formed within the coagulum at the orifice of the medullary cavity.

d. The comparatively large extent of ossific deposit produced in the coagulum between the two ends of the bone.

e. A detached portion of the fractured bone, involved in the coagulated blood, and eventually restored to its circulation and other functions, as proved by the change in the figure of its longitudinal canals, seen upon the section.

The minute texture of the new bone formed at different points has at this period become so uniform, as to have lost the peculiarities of appearance which at first distinguished that within

the medullary cavity from that within the periosteum.

The effect of interstitial absorption is much less apparent upon this specimen, than upon that forming the fifth figure, although the latter was of the earlier date.

PLATE V.

Fig. 7. Exhibits a section of bone half an inch in length, (from the same specimen as *Fig. 8.*) shewing the structure of the original bone, contrasted with that of the new deposit, by which it is surrounded.

- a.* That part of the bone terminating the broken cylinder, in which is seen the usual appearance of the longitudinal canals.
- b.* A considerable cavity between the internal surface of the cylinder, and the substance of the new deposit.
- c c c.* Displays the beautiful variety in the size and distribution of the various canals and cavities in the new structure, within which the vessels, membranes, and medullary secretions were contained.

Fig. 8. Shews the structure of callus from the human subject, three years subsequent to its formation.

- a.** The surface of the newly formed bone.
- b.** The lower part, or that towards the cylinder of the femur, upon which the mass was deposited.
- c c c.** The irregular cavities and canals within the substance of the new bone.
- d d.** Openings by which the membrane covering the bone externally, established its communication with the cavities within the new structure.

BRIEF NOTICE
PRESENTED TO THE
MEDICO-CHIRURGICAL SOCIETY
WITH THE
ORIGINAL
OBSTETRIC INSTRUMENTS
OF THE
CHAMBERLINS.

RW
BY H. H. CANNARDINE, Esq.

Read March 17, 1818.

IN depositing the Obstetric Instruments of the Chamberlins among the archives of the Medico-Chirurgical Society, I beg to offer a few facts and observations, which may serve to authenticate their genuineness and their originality.

The estate of Woodham Mortimer Hall, near Maldon in Essex, was purchased by Dr. Peter Chamberlin some time previous to 1683, and continued in his family till about 1715, when it was sold by Hope Chamberlin to Mr. William Alex-

ander, wine-merchant, who bequeathed it to the Wine-coopers' Company. The principal entrance to the mansion is through a porch, the masonry of which, being carried up with the building, serves as closets to its respective stories. Two or three years ago, a lady with whom I am intimately acquainted, (and from whom I had the particulars,) discovered in the floor of the upper closet a hinge, and tracing the line, she saw another, which led to the obvious conclusion of a door; this door she soon found means to open. There was a considerable space between the floor and the ceiling below, and this vacancy contained divers empty boxes, &c. Among those was a curious chest or cabinet in which was deposited a collection of old coins, trinkets, gloves, fans, spectacles, &c. with many letters from Dr. Chamberlin to different members of his family, and also these Obstetric Instruments. Being on terms of intimacy with the family resident at Woodham Mortimer Hall, these Instruments have been presented to me, and I have now the satisfaction of depositing them with your Society for the gratification of public curiosity, and to secure to Chamberlin the meed of posthumous fame, due to him for his most useful discovery.

With respect to these Instruments I would briefly observe, that they appear to me to contain *within themselves* the most direct and conclusive evidence of originality of invention; and that even the pro-

gress of this invention may be distinctly traced in its different stages as it passed through the mind of the inventor. First, we have a simple vectis, with an open fenestrum, (supposed to be of much more recent invention.) Then we have the idea of *uniting two* of these instruments by a joint, which makes each blade serve as a fulcrum to the other, instead of making a fulcrum of the soft parts of the mother; and which also unites a power of drawing the head forward. This idea is at first accomplished by a pivot, which being *rivelled* makes the instrument totally incapable of application! Then he goes to work again, and having made a hitch in each vectis for the joint, he fixes a pivot in *one only*, which, projecting, is to be received into a corresponding hole in the other blade, after they have been applied *separately*. It may be observed, that although there is a worm to the projecting part of the pivot, yet there is no corresponding female screw in the hole which is to receive it. Every practical accoucheur will know that it is not easy, or always possible, to lock the joint of the forceps with such accuracy as to bring this pivot and hole into apposite contact. This Chamberlin soon discovered, and *next* produced a more light and manageable instrument, which, instead of uniting by a pivot, he passes a *tape* through the two holes and winds it round the joint, which method combines sufficient accuracy of contact, security, and mobility.

From the roughness of the workmanship, I am led to conclude that Chamberlin was his own artificer; a practice, I am told, not uncommon in those days, when mystery and empiricism were not regarded as contemptible even among the enlightened professors of science.

RW
H. H. CASSARDINE.

London, February 6th, 1818.

CASE
OF
ANEURISM IN THE ARM,
CURED BY
TYING THE SUBCLAVIAN ARTERY.

BY DR. POST, OF NEW YORK.

COMMUNICATED
BY MR. COOPER.

Read Feb. 17, 1818.

A GENTLEMAN, aged twenty-seven years, came to this city on the 7th of September, 1817, for the purpose of obtaining my advice in relation to an aneurism of the left arm. He had been three or four years afflicted with the complicated effects of lues venerea, and of the remedies which had been employed for its cure; and at this time there were three extremely ill-conditioned ulcers on his left fore-arm.

The tumor was situated at the upper and inner part of the arm, and was first discovered about

three weeks before he came to New York. At this time, according to his account, it was about the size of a pullet's egg, attended by a pulsation, and an obtuse pain which extended to the limb below.

About fifteen days after he observed the swelling, while in the act of lifting a package of goods from a shelf in his store-room, he was seized with a violent pain in the tumor, which lasted about an hour, and gradually subsided. After this he observed the tumor to increase in size with considerable rapidity.

On the 6th of September he was again affected with violent pain in the tumor and limb, which induced him to request the advice of Dr. Gilbert of Newhaven, where he resided. The tumor at this time was larger than a goose-egg, and its base extended into the axilla. There were also two or three dark spots on the surface, near the apex, and the integuments at the most prominent part appeared very thin.

The nature and progress of the disease having been ascertained, Dr. Gilbert advised the patient to come immediately to New York for my opinion as to the means proper to be adopted for his relief; and as appearances justified the apprehension that the tumor might soon burst, a due support

was given to it by adhesive plaster, and Dr. G. accompanied him to town.

I saw the patient on the 7th, soon after his arrival in the city. The tumor at this time was extremely tense, and the pulsation strong in every part of it, and particularly at the apex. The discoloration which was very evident the day before, had in a great measure disappeared.

The importance of the case rendered it proper that some other gentlemen of the faculty should see it with me, and accordingly Drs. Kissam, Borrowe, and Mott were requested to meet me in consultation the following morning. At this visit, we were informed that our patient had experienced during the preceding night extreme pain in the tumor and the whole of the arm, which still continued with little or no mitigation, notwithstanding he had taken nearly four grains of opium. The tumor had increased very considerably since the day before, but the pulsation was so much weakened as to be perceived only by the nicest examination. The lower part of the limb had now also become considerably swelled.

The nature and progress of the disease rendered it necessary that very prompt measures should be adopted; and that of tying the artery above the tumor was thought the most eligible; and

one o'clock was the hour fixed for its performance.

The high situation of the tumor on the arm, and the extension of its base into the axilla, precluded the operation at this part, and it was therefore determined to tie the artery above the clavicle.

An incision, commencing at the outer edge of the tendon of the mastoid muscle, was carried through the integuments about three inches in length, in a direction deviating a little from a parallel line with the clavicle. This divided the external jugular vein, the bleeding from which required a ligature for its suppression; and in proceeding with the operation, three or four arterial branches were cut, which it was also necessary to secure. The subclavian artery was then sought for immediately external to the scaleni muscles, and was easily laid bare. Passing over the artery at this place, in contact with it, were three considerable branches of nerves, running downwards towards the chest from the plexus above. These were separated, and the ligature passed under the artery with great facility by the instrument well-adapted to this purpose, invented by Drs. Parrish, Hartshorne, and Hewson, of Philadelphia. On tying the ligature, all pulsation ceased in the limb; the edges of the wound were now brought

together, and secured by sutures and adhesive straps, and a light covering of lint finished the dressing.

The patient complaining of great pain in the whole course of the arm, eighty drops of tinct. opii were given to him, and he was put to bed. At the end of an hour, the pain continuing violent, forty drops more were administered, and this proving insufficient for his relief, an additional forty drops were taken at the end of another hour.

Five o'clock, P.M. The pain is in a great measure relieved; no sensible diminution in the tension of the tumor; he experiences a sensation of numbness through the whole arm; pulse eighty-seven; the temperature of the limb in no degree diminished; on the contrary, it seems rather greater than in the other arm, which probably arises from the covering of flannel.

Nine o'clock, P.M. Complains of very little pain; pulse considerably excited; skin hot and moist; the limb above the elbow has its natural sensibility.

Twelve o'clock. He is free from pain, but the fever is increased; pulse 110, with considerable fulness; skin moist; is inclined to sleep.

September 9th, seven o'clock, A.M. Has passed a comfortable night; pulse 100, and soft; perspiration free; the tumor less tense than last evening, but is considerably inflamed, and there are two livid spots at and near the apex about the size of a shilling. Ordered a saline purgative, and to have a dilute spirituous lotion applied to the inflamed surface.

Seven o'clock, P.M. The tension of the tumor still less, and the inflammation on the surface is diminished; the livid spots continue; the swelling of the limb below the tumor has almost subsided; the bowels have been evacuated three times by the salts; a gentle perspiration has continued throughout the day; pulse 90, and soft.

September 10th, seven o'clock, A.M. The patient has rested well throughout the night; pulse 94; the tumor is more flaccid, the livid spots have a darker hue, and its apex is more prominent and soft; a soft bolster was placed under it, so as to afford a moderate support.

September 11th, seven o'clock, A.M. Has slept most of the night; the tumor has diminished about one fifth; is less inflamed and livid; pulse 96; expresses a desire for food, and has permission to take a little chicken soup. On the evening of this day was a little more excited, and directed to discontinue his animal food.

September 12th, ten o'clock, A.M. The patient had a good night's rest; pulse 80; skin of the natural temperature; a slight pulsation can be felt at the wrist; the tumor diminishing, but seems ready to burst at the apex, where the contents appear to be confined by a covering not thicker than cuticle; the inflammation of the integuments has disappeared. Ordered to have an adhesive plaster applied over the whole surface of the tumor for the purpose of support, and to have his bowels opened by a repetition of the cathartic.

September 13th. The day passed comfortably, but in the evening there was a sudden gush of a small quantity of blood from the wound, which, however, soon spontaneously ceased flowing.

September 14th. The patient is quite tranquil; has a little bloody discharge from the wound; the ulcers on the fore-arm rapidly healing.

September 15th. The dressings were for the first time removed this morning, after having been softened by emollient poultices the preceding night. Adhesion of the sides of the wound had taken place to a considerable extent; the tumor had decreased about one half.

September 17th. In the afternoon the aneurismal tumor burst, and about three ounces of dark

coagulated blood were discharged ; a little lint was applied over the opening and retained by an adhesive strap.

September 18th. The wound was again dressed ; suppuration free, and the granulations tolerably healthy. The patient has complained of pain in the wrist and hand for several days, which has been particularly severe at night.

September 20th. The dressings were removed from the tumor, and about four ounces of grumous blood discharged from the aneurismal sac, which occasioned an entire disappearance of swelling about the part. The wound looking rather pale, and the discharge thin and discoloured, an infusion of bark was ordered, which was discontinued the following day on account of increased action and fulness of pulse. The patient after this had a febrile paroxysm daily till the 24th, which went off every evening by perspiration. At this time the wound had improved in appearance, the granulations were more florid, and the discharge more healthy.

September 26th, (18th day.) On dressing the wound this morning, the ligature with which the subclavian artery had been tied, was found cast off and lying upon the surface of the granulations.

September 30th. The wound is now nearly healed. The tumor has entirely disappeared, but there is a slight ulceration in the integuments where the blood was discharged, and a small oozing of serous matter, coloured in some degree, probably by a small quantity of blood in the sac, which is not yet entirely obliterated. The ulcers on the fore-arm have all healed except one, which is very small. The wrist and hand are slightly benumbed, and pain is felt in them, more especially at night. The pulsation in the artery at the wrist can be distinctly felt, but the strength of it has not perceptibly increased for some time past. The patient's general health is fast improving, and he is able to sit up a considerable part of the day and walk in his room.

October 11th. The wound is entirely healed; his general health is perfectly good; the pain in his hand is now confined to the extremities of the fingers, and is daily lessening; the power of using the arm is increasing every day.

October 16th. The patient having no complaints, except a little occasional pain in the fingers, and a small superficial sinus at the part where the aneurismal tumor ruptured, and being desirous of returning to the place of his residence, it was thought unnecessary to detain him any longer; and he accordingly left the city.

A SINGULAR CASE
OF
EXPULSION
OF A
BLIGHTED FŒTUS AND PLACENTA
AT SEVEN MONTHS,
A LIVING CHILD STILL REMAINING TO THE FULL PERIOD
OF
UTERO-GESTATION.

By JOHN CHAPMAN, Esq.

MEMBER OF THE ROYAL COLLEGE OF SURGEONS, AND SURGEON
IN WINDSOR.

COMMUNICATED

By Dr. BAILLIE.

Read March 3, 1818.

ALTHOUGH the following case may not contain any useful practical hints, or be capable of any deduction that may improve or increase our present knowledge, yet from its novelty and singularity will perhaps be considered not entirely unworthy the notice of the Society. Hitherto I have not been able to meet with any thing like it on record : the only case that I know bearing any

analogy, is that published by the late Dr. Clarke in the 16th Volume of the Medical and Physical Journal, page 53. but they will be seen to differ in their circumstances, as in the latter a blighted foetus (about the third month) was expelled two days after the birth of a living child; whereas in that I am about to relate, a similar instance took place two months before.

On the 9th of October, 1816, Mr. R. of Clewer called on me to say that his wife, being about seven months advanced in pregnancy, was taken very unwell, and he expected might require my assistance in the course of the day; adding, that about three o'clock in the morning, (it was now nearly nine o'clock,) she had been suddenly surprised with a considerable flooding, and notwithstanding it was much abated, she appeared getting into pain. I informed him, it would be better for me to see her immediately; that the hæmorrhage might again increase and yet labour not come on at present, and it was necessary to give her some directions for her management.

On my arrival, the nurse informed me the pains had continued to increase, and that something had just come away which she had preserved in a basin. On examining this substance, I discovered it to be a perfectly healthy placenta, the size they usually are between five and six months, to which was attached

the membranes also, quite perfect, but of a dirty yellow colour, flattened and closely embracing a small foetus not larger than they are generally seen between three and four months, without any liquor amnii, although it did not appear that any could have escaped. After these had passed, the pains and flooding entirely ceased, but my patient observed, "I am not any less, and I still feel the child as much as ever." I instantly applied my hand to the abdomen and found she was quite correct, for that she was certainly as large as women generally are at seven months; and after keeping it there a few minutes, I very sensibly perceived the motion of the child.

I remained with her for some time without either pain or hæmorrhage returning; I did not therefore think it necessary to make a more particular examination, but enjoined quiet, ordered an opiate to allay the constitutional disturbance occasioned by the alarm, and directed that I might be instantly sent for, should either hæmorrhage or pain return, and then took my leave with the placenta and foetus which I have preserved in spirits.

I continued to visit my patient daily for about a week, and afterwards occasionally for two or three weeks more; and as she remained free from pain, and had continued progressively to recover her strength, I allowed her to join her family as

usual, observing she would now most probably go on very well to the end of her pregnancy. From this time I did not either see or hear from her till the 10th of December, when I was sent for in haste. She was now in violent pain, and the head of the child had just passed the os externum as I entered the room: two or three more pains completed the delivery of a very fine full-grown little girl: the placenta soon followed. She had a very good getting up, without an irregular or ill symptom.

I have mentioned the case, and shewn the placenta and foetus to several of my medical friends, who all think it a very uncommon and singular case; so that I am quite rejoiced to have an opportunity of presenting the placenta and foetus to the Society; and that the little girl also continues a living witness.

I have thus far given a correct statement of this as far as I know unparalleled case, and do not attempt to offer any remarks more than to observe, that I certainly did not expect the os uteri could have been dilated to the size it must have been, accompanied with the necessary expulsive pains, to force this placenta and foetus through it, and yet the pains again subside without going on to empty the uterus; and not only going entirely off, but that gestation should con-

tinue to go on equally well as if the uterus had not suffered any disturbance, but had just thrown off what it was unequal to bring to perfection, and all was well again. Mrs. R. had not menstruated since the beginning of March.

SOME OBSERVATIONS
ON ONE SPECIES OF
NÆVUS MATERNUS;
WITH THE
CASE OF AN INFANT
WHERE
THE CAROTID ARTERY WAS TIED.

By JAMES WARDROP, Esq. F.R.S. Ed.

Read March 17, 1818.

THE structures of the different tumors which have been classed under the general name of Nævi Materni, have not yet been satisfactorily described. Perhaps the subsequent observations may assist in elucidating the structure of one species of the disease; and the case which I have related where the Carotid artery was tied, may throw some light on the treatment of such tumors.

The Aneurism by Anastomosis has been accurately described by Mr. John Bell, and its character distinctly established. There is another tumor frequently confounded with it, which is entirely

confined to the skin, and to which the term *Nævus* has been usually applied. This form of the disease may with propriety be denominated the *Cuticular Nævus* in order to distinguish it from the others. But the tumor which is the subject of the present observations, and which has seldom been discriminated from the other two, is formed underneath the skin, being situated in the cellular membrane between it and the subjacent muscles. From being formed underneath the skin, I shall denominate this species of tumor the *Subcutaneous Nævus**.

§ I. *History of the disease.*

The Subcutaneous like the Cuticular *Nævus* is always congenital, and there is no part of the body where such tumors are not met with; though they are most frequently formed about the face.

The limits of the Subcutaneous *Nævus* can always be accurately determined by the touch; its form is usually flattened; and it is very moveable, lying loose upon the muscles, and not adhering to the skin until it arrives at its advanced stage. The

* It may be proper to take notice of the confusion that has arisen among French and English writers in the acceptation of the term *Fungus Hæmatodes*: the French having applied the name *Fungus Hæmatodes* to the *Nævus Maternus* as well as to the *Anastomosing Aneurism*, these two tumors being by them considered as two species of the same disease.

skin covering this species of tumor retains its natural colour until the swelling becomes prominent, when the large vessels shine through, giving the diseased mass more or less of a purple hue.

When the Subcutaneous Nævus is small, it has a doughy and inelastic feel, resembling that of a spermatocele, and seems to have little sensibility.

The bulk of this tumor may be greatly diminished by squeezing it, and it becomes more distended when the child cries or is irritated.

Unlike the anastomosing aneurism, the Subcutaneous Nævus is not attended with distinct pulsation, but there is an universal throbbing which can be felt most distinctly on squeezing it.

When the bulk of the tumor is considerable, the blood-vessels which pass into it are usually of a very large size, rendering the removal of such a tumor by the knife extremely dangerous.

The progress and termination of this disease are various. Sometimes the tumor is very small, and never increases in bulk. Sometimes, like the Cuticular Nævus, it has been observed gradually to diminish in size without any obvious cause. In some cases there is a progressive increase in its bulk, and this is extremely gradual, the disease not assuming a serious aspect until the person be considerably advanced in life. In other instances,

particularly if the tumor be small, a process of ulceration commences in the skin, and a greater or less portion of it, as well as of the substance of the tumor itself, ulcerates and sloughs away. This ulcerated surface is finally cicatrized; and though the edges of the original tumor may still remain, yet the progress of the disease seems to be arrested, and it undergoes no alteration in future life. But in some cases this species of tumor has a formidable appearance at birth; the skin which has already become distended and discoloured, in a few days gives way, a hæmorrhage taking place which soon proves fatal.

§ II. *Appearances on dissection.*

The appearances which the Subcutaneous Nævus presents on dissection, demonstrate very satisfactorily the structure, and explain all the phenomena of the disease.

When the tumor is removed from the living body, its size is greatly diminished by the escape of the blood with which it was distended; but if it be of considerable bulk, the vessels passing into it are so large, that by throwing a coloured fluid into one or more of them, the diseased mass is distended nearly to the same size as when it was supplied with blood.

A Child was born with a very large Subcutaneous Nævus on the back part of the neck, situated

over the occipital extremity of the left trapezicus and sterno-mastoid muscles. It was of the form and size of half an ordinary orange. The tumor had been daily increasing, and I saw it on the tenth day after birth, when the skin had given way and a profuse hæmorrhage had taken place. Notwithstanding the bleeding, no diminution had taken place in the size of the tumor. It felt warmer than the surrounding skin, was very soft and compressible. Squeezed in the hand it yielded like a sponge, and was reducible to one-third of its original size. In its compressed state it looked like a piece of corrugated skin, its colour being nearly that of sound integument. On removing the hand the tumor rapidly filled, the skin again becoming purple. There was no distinct pulsation, but a violent throbbing was felt in the tumor, and arteries beating strongly passed towards it.

Conceiving the immediate extirpation of this tumor the only chance of saving the infant, I removed it as expeditiously as possible, and made the incision of the integuments beyond the boundary of the tumor; aware of the danger of hæmorrhage where such tumors are cut into. So profuse, however, was the bleeding, that though the whole mass was easily removed by a few incisions, the child expired.

The tumor having been injected by throwing coloured size into a few of the larger vessels, its intimate structure could be accurately examined.

Several of the vessels which from the thinness of their coats appeared to be veins, were of a large size, and there was one sufficiently big to admit of a full-sized bougie. This vessel is represented in one of the drawings, and is fully as large as the carotid artery of an infant*. The boundaries of the tumor appeared distinct, some healthy cellular membrane surrounding it, which was traversed by the blood-vessels. On tracing these vessels to the diseased mass, they penetrated into a spongy structure composed of numerous cells and canals of a variety of forms and sizes, all of which were filled with the injection, and communicated directly with the ramifications of the vessels†.

These cells and canals had a smooth and polished surface, and in some parts resembled very much the cavities of the heart, fibres crossing them in various directions like the columnæ tendineæ.

The opening in the skin through which the blood had escaped during life, communicated directly with one of the large cells of the tumor, and, as is represented in the drawing, the largest vessel passed directly into that cavity.

Several tumors of the same kind which I have

* See Plate VI. Fig. 2.

† See Plate VI. Fig. 3.

dissected, exhibited a structure precisely similar to that which has now been described.

§ III. *Treatment of the disease.*

The treatment of this kind of tumor has not usually been very successful. When the swelling has been small, I have already mentioned that in some instances it has remained throughout life without undergoing any alteration. In other instances it has gradually been absorbed; and in some an ulcerative process has taken place which destroyed the greater part of the tumor, the remaining portion continuing unchanged or being gradually absorbed.

Pressure and cold have been recommended by Mr. Abernethy in the treatment of Nævi; and where these can be advantageously employed, they have in many instances been useful, particularly in the Cutaneous Nævus. Extirpation by the knife has been most commonly resorted to. The operation has frequently been attended with difficulty from the situation of the tumor; but more particularly from the hæmorrhage which accompanies the operation. The loss of blood has often been so great as to produce serious consequences; and in the case already detailed, so large were the vessels, that their division instantly proved fatal. It was the unfortunate result of extirpation in the case which has been detailed, and the easier mode by

which the supply of blood to the tumor might be stopped, which led me to propose the practice adopted in the following case.

An infant was brought to London on account of a Subcutaneous Nævus on the left cheek, of a very unusual size. I saw it when it was six weeks old. The base of the tumor then extended from the temple to beyond the angle of the jaw, completely enveloping the cartilage of the ear. Its form was semispherical, the upper part of its surface being flattened from a large portion of the integuments having ulcerated. This ulcer was about three inches in diameter, its surface having a sloughing appearance and accompanied with a good deal of fætor*.

The skin on the rest of the tumor was covered with turgid vessels, and the external jugular and angular veins were greatly distended, particularly when the infant screamed, which it generally did both during the day and night at short intervals.

The tumor was soft and doughy, and its size could be much diminished by pressure. It did not pulsate distinctly, but there was a throbbing in it, and the vessels in the neighbourhood beat strongly.

This tumor was about the bulk of a small-sized

* See Plate VI. Fig. I.

orange at birth, and had been daily increasing. The ulceration of the skin had existed twelve days, from which there had been several profuse hæmorrhages.

The infant was so extremely emaciated and feeble, that before any means for the cure of the tumor could be adopted, an attempt was made to strengthen the child by giving it at short intervals, and in small quantities, milk, beef-tea, brandy, and opium. These means had the most decided effect in restoring the vital powers, and on the following morning the infant began to suck its nurse, which it had not previously done for some time.

Though this tumor was quite moveable, and its base accurately circumscribed, yet I had learnt from the operation in the case which has already been detailed, the danger to be dreaded from any attempt to extirpate a Subcutaneous Nævus of such a size, situated in any part of the body. It therefore appeared to me, that as the extirpation of the tumor was impracticable, two important points might be gained by tying the trunk of the common Carotid artery. One of these would be, the immediate effect in arresting the tendency to a fatal hæmorrhage; the other, the reduction of the bulk of the tumor. For as from the dissection of such swellings they appeared to be composed of numerous cavities and canals through which

blood is freely circulated, it was reasonable to expect that by stopping the circulation through the Carotid artery, the flow of blood through this tumor would be interrupted, some of the blood contained in its cavities would coagulate, whilst some might be absorbed, and the cells thus collapse or be obliterated. Besides, it was to be expected that the sloughing process already begun in this tumor was to go on, and thus the disease to be ultimately destroyed. A process which, I have already noticed, nature sometimes employs very successfully for the removal of such tumors, and which probably might have been completed in this instance without the assistance of art, had not the profuseness of the bleeding accompanying the process threatened the destruction of the child.

The temporary restoration of the child's health and strength by the cordials which had been given during twenty-four hours, afforded perhaps the only opportunity which might have occurred of performing the operation; and as the opinion of Mr. George Young and Mr. Travers, who were consulted in the case, coincided with my own, by their able assistance the operation was immediately performed.

In making the incision through the integuments it was necessary to guard against wounding some large veins. The incision was made along the tracheal edge of the sterno-mastoid muscle, and

with a blunt instrument the sheath of the artery was readily exposed. By keeping apart the edges of the incision the sheath was easily slit open, the artery laid bare, and the eye of a probe armed with a small ligature passed under it. The ligature was moderately tightened with a single knot, and the lips of the wound brought together with a stitch and adhesive plaster.

The operation produced no change in the child's countenance, but in a very few hours there was a manifest alteration in the appearance of the tumor. It became soft and pliable, lost its purple colour, and the tortuous veins collapsed.

On the *second* day after the operation, a very remarkable change had taken place in the bulk of the swelling, and the skin covering it had resumed its natural pale colour. The ulceration continued to extend, accompanied with a good deal of fætor; but the child continued to support its strength. The balsam of Peru was now applied with pledgets of lint to the surface of the ulcer, and it had the immediate effect of stopping the process of sloughing and of destroying the fætor.

On the following day the bulk of the tumor continued to diminish; the child was entirely nourished by sucking, and its lips had become florid. There was no swelling or redness of the wound.

On the *fourth* day after the operation, the tumor had considerably increased in bulk, the integuments covering it had become livid, and the adjacent veins turgid. The inosculating branches of the temporal and occipital arteries had greatly increased in size, having become tortuous and very vigorous in their action. On the right side the pulsation of these vessels was strong; but on the left, the side where the tumor was situated, they were much more feeble. A very small quantity of blood had oozed out from the ulcer, and there was a slight fætor.

After remaining without much alteration, on the *seventh* day the tumor had again evidently diminished both in bulk and in the vigour of pulsation in the arteries. The infant appeared easy, and its general health continued good.

On the *ninth* day the child slept longer than it had done since its birth. The ulceration continued to go on slowly, and the dried crust which was formed in the centre of the ulcer, and which had been considerably elevated, now appeared depressed from the process of absorption going on underneath. The bulk of the tumor had now diminished fully one half.

On the *twelfth* day, it was observed that the child's countenance had been daily improving, and the body, though much emaciated, had the

appearance of health; the skin was moist and mottled, the lips red, the bowels regular, and it continued to suck eagerly, getting no other nourishment. The surrounding vessels had become much less turgid, and the skin covering the tumor, as well as that of the ear, had acquired its natural colour. The auricular portion of the swelling had so much diminished, that the cartilage of the ear, which at one time was elevated by the tumor, had nearly fallen into its natural situation. Part of the ulcer which had rather a granulating appearance now looked sloughy. A common poultice having been applied for two days, the central portion of the tumor which appeared like a mass of hardened blood, was softened, and I removed considerable portions of it. It cut like liver, and when washed in water it exhibited a spongy structure. It seemed as if from tying the carotid artery the circulation of blood through this portion of the tumor had been arrested, and that which filled the cells had coagulated. The more rapid decay of this than the anterior portion of the tumor, probably arose from the latter being readily supplied with blood by the anastomosing branches of the submental, labial, and other arteries.

On the *thirteenth* day the child became suddenly weaker, refused to suck, and notwithstanding the use of brandy and opium in repeated small quantities, it rapidly sunk, and died on the fourteenth day after the operation, exhausted by the irrita-

tion of an ulcer which had now involved the whole surface of an enormous tumor *.

On reviewing the history and treatment of the two cases of Subcutaneous Nævus which have been detailed at some length, the treatment which I have employed in others, together with the structure of the tumor, it appears to me that some general rules may be given for the management of this species of tumor under all the varieties of size, form, and situation which it may assume.

Tumors of this description may be removed by the knife, by ulceration, by absorption, by tying the vascular trunks supplying them, and by ligature; these different means being employed singly or combined as may appear best adapted to the individual case.

When the tumor is small, or even of a moderate size, there is no part of the body from which it may not be with safety removed by the knife. The only circumstance which requires particular attention in performing such an operation is, to avoid cutting into the substance of the tumor; for if this be done, the hæmorrhage is violent; whereas by making the incisions beyond the diseased structure, the flow of blood is much more

* See Plate VI. fig. 1.

moderate, and so completely ceases after the tumor is extirpated, that I have never found it necessary to tie any vessels with a ligature.

Instead of removing the Subcutaneous Nævus by the knife, I have in a few cases imitated the ulcerative process already mentioned, as sometimes coming on spontaneously. I was first led to adopt this practice, from having observed many years ago the effect of a strong solution of the corrosive sublimate applied to a Subcutaneous Nævus on a child's back. In this instance, the skin ulcerated and the ulcer spread rapidly, destroying not only the integuments, but the substance of the tumor. In cases where the knife cannot be with safety used, this mode of treatment may be advantageously employed, and it may in some cases be preferred even where the extirpation of the tumor is practicable.

When a Subcutaneous Nævus is to be removed by ulceration, the process may easily be commenced by destroying a central portion of the skin with lunar caustic or kali; and when the ulceration is once begun, it goes on rapidly until the whole mass is destroyed, merely a discoloured edge being left. Should at any time the ulceration advance too rapidly, and the sore begin to slough, as frequently happens, that process may be powerfully controuled by the application of the balsam of Peru to the surface of the sore; an application

which has very successfully been employed in the East Indies in sloughing ulcers, and from which I have in similar cases derived the most decided benefit*.

But there are cases of Subcutaneous Nævus so formidable from their size and situation, that the extirpation of the tumor is impracticable; and where the hæmorrhage accompanying the ulcerative process, when such takes place, is still more dangerous. The two cases which have been narrated illustrate this observation. It is in such tumors where I would advise tying the trunk or trunks of the arteries which supply the tumor. From the result of tying the Carotid artery in the Subcutaneous Nævus on the cheek, and the effects of tying the same vessel where there was an Aneurism by Anastomosis in the orbit, important advantages are to be expected from the operation:—these are, the diminution of the bulk of the tumor by cutting off its supply of blood; the danger from hæmorrhage being diminished, should the ulcerative process have commenced; and the rendering it practicable to remove such a tumor by the knife, the extirpation of which was previously extremely dangerous or even impracticable.

When the supply of blood to the tumor is ar-

* Asiatic Journal.

† See Mr. Travers's Case in Vol. II.

rested, an immediate diminution of its bulk will take place; and whether the ulcerative process or extirpation is to be had recourse to for its ultimate destruction, the size may still be further diminished by forcibly squeezing out its contents, and afterwards making use of compression by adhesive plasters and bandages.

We are not yet entitled from experience to lay down any rule for deciding, whether extirpation or the ulcerative process should be preferred for the removal of such tumors. It is very probable that a child's health would be less disturbed by extirpating a large tumor of this kind with the knife, than destroying it by the more tedious process of ulceration.

How far it may be advisable in some cases to remove large Subcutaneous Nævi by ligature, I cannot from experience decide. Mr. White informed me, that he thrust a needle through the middle of a very large Subcutaneous Nævus on a child's shoulder, and included each half of the swelling within the noose of a ligature. The operation was attended with complete success.

Case of Aneurism by Anastomosis of the Finger.

Whilst considering the treatment of the Subcutaneous Nævus, it may not be out of place here to relate a case where an ingenious mode of treatment was employed by Mr. Lawrence for the cure of an Aneurism by Anastomosis.

“ A woman, twenty-one years old, has been for the last three or four years under the care, first of Mr. Hodgson, and subsequently of myself, for a pulsating tumor of the finger, of the description which has been called Aneurism by Anastomosis. She does not remember its commencement, but rather supposes that it had existed from the time of birth : it increased in size, and began to be troublesome about four years ago.

“ The complaint occupied the ring finger of the right hand : there was a general fulness of the first phalanx, but the chief swelling was on the palmar surface and ulnar side of the finger, the circumference of which may probably have exceeded the natural dimensions by one third. The swelling was soft and compressible ; the vessels composing it were obscurely discernible through the skin, and gave it a slight reddish or livid tint. There was a sensation of heat in it ; and it was rather warm to the touch. It pulsated strongly, just like an an-

eurism. The digital artery of the corresponding side was very large, and conspicuous by its size and strong pulsation in the palm of the hand. The veins at the back of the finger, hand, and fore-arm were turgid; and the integuments of the hand, on its dorsal surface, marked by a line of discolouration exactly like that which remains after a bruise. There were painful sensations in the part, extending successively to the hand, fore-arm, arm, and breast: these were so much aggravated by any exertion, that the whole limb was rendered useless for any offices that required a continued effort, however slight.

“ Having ascertained that the beating could be stopped entirely by pressing on the radial and ulnar arteries at the same time, but not having been able to satisfy himself that compression of the enlarged digital artery produced this effect, and having tried ineffectually for several months compression and other external means, Mr. Hodgson tied both the trunks first mentioned in January 1815. The consequences of the operation were, an entire cessation of the beating, collapse of the swelling, and relief from pain: but these symptoms all recurred in a few days, and were just as bad as before.

“ Compression was again unavailing. The pains, which now reached to the shoulder and chest, not only prevented her entirely from following her for-

mer occupation of needlework, and rendered the limb useless for most of her ordinary occasions, but greatly disturbed her rest, and made her very desirous of trying some means of relief. When she consulted me, after my friend Mr. Hodgson had left town, I informed her that the amputation of the finger at the metacarpal joint was the only effectual proceeding I could propose ; but she immediately and decidedly rejected all idea of such a mutilation. The only other plan that occurred to me was that of dividing all the soft parts by a circular incision close to the palm so as to cut off the supply of blood ; and to this her sufferings induced her to submit, although it was represented to her as a painful operation, and of rather uncertain effect.

“ Assisted by Mr. George Young and Mr. Samuel Cooper, who had sanctioned the proceeding by their approval, I made a circular cut through all the soft parts, excepting the flexor tendons with their theca, and the extensor tendon. The digital artery, which had pulsated so evidently in the palm of the hand, was fully equal in size to the radial or ulnar of an adult, and was the principal nutrient vessel of the disease. After tying this and the opposite one, we were much surprised at finding so strong a jet of arterial blood from the other orifices of these two vessels as to render ligatures necessary. This occurrence, however, dissipated any apprehensions that might have been

entertained respecting the subsequent supply of the finger. The edges of the incision were brought together by four sutures, but could not be very satisfactorily united in consequence of the tumor, and indeed the whole finger beyond the cut swelling very considerably. It seemed as if the diseased vessels were distended with blood, which could not be carried back by the veins ; for large vascular trunks, turgid with blood, were conspicuous through the skin, which had a deep red and nearly livid colour.

“ The wound of the incision healed slowly ; the swelling subsided, but did not entirely disappear ; and the integuments recovered their natural colour. The pulsation and the pain were put an end to.

“ At the present time, there is still a fulness of the part, but without any beating ; and some minute red vessels are visible in the skin, like those which are sometimes observed ramifying in the integuments of the face. The venous distension and general pain of the limb are gone, and the natural powers of the part are so far recovered, that she can work at her needle for an hour together, and use the arm for most purposes.”

December, 1817.

NOTES OF A CASE
OF
MERCURIAL ERETHISM.

By T. BATEMAN, M.D. F.R.S. &c.

Read March 31, 1818.

THE singular and often fatal affection which occasionally supervenes during a course of Mercury, when that medicine acts as a poison on the system, was first noticed, with the above appellation, by that able pathologist, Mr. John Pearson; and his terse and perspicuous description of the symptoms which characterize it, constitutes, I believe, the only history of the disease to be found in his medical writings*. It is evident, however, that the features of the malady are not sufficiently known, even to the most enlightened members of the profession: for the failure on the part of the medical advisers, in the instance about to be related, to recognise its first symptoms, and the consequent repetition of the dose of the poison, after

* See his Observations on the effects of various articles of the Mat. Med. in Lues Venerea. Chap. XII.

its commencement, had nearly rendered it fatal. I conceive, therefore, that a narrative of the progress of a severe case of this disease may not be uninteresting to the Society, and that by affording a more distinct view of its character, it may perhaps contribute to preserve other individuals from the sufferings and danger incurred in this instance.

The mercurial inunction which occasioned this erethism, was resorted to under the sanction of the first medical authority, with a view to relieve an amaurosis of the right eye, which had come on during the preceding summer, in connection with a considerable derangement of the chylopoetic functions, and was commenced after a residence of three months at Brighton, during which these functions and the general health had been materially improved.

CASE.

January 16th, 1817. Began mercurial friction, using a drachm of the ointment every night.

23rd. Gums slightly tender ; nightly febricula.

24th. Languid and feverish ; gums reddish and slightly spongy. At four in the morning of the 25th, a violent and irregular beating of the heart came on, which did not yield to laudanum and stimulants, but suddenly went off about one, P.M.

25th. A very feverish night, with much perspiration, and early in the morning a copious motion with much griping, a Seidlitz powder taken the preceding morning having failed to operate in the course of the day.

26th. On getting up, very severe griping, which continued nearly all day, without tenesmus, but somewhat relieved towards evening by opiate lozenges; mouth more decidedly sore, and irregularity of circulation returning at 11 A.M. and continuing all day, omitted the mercury this night.

27th. Palpitation went off during sleep last night, and the feelings being comfortable during the day, the friction was repeated at night; but towards morning the heart's action became again disturbed.

Tuesday, 28th. As this disturbance continued, it was determined at a consultation this afternoon, that it was absolutely necessary to desist altogether from the use of mercury at present. During the remainder of this week, the disturbed action of the heart continuing unremitted, the strength and power of exertion became considerably impaired, yet the patient was able to walk some distance, and rode a good deal in coaches, and on Friday and Saturday passed the evening in visits to two friends. During this week, a cough, which had been slightly troublesome for some time, and which was obviously connected with a flatulent state of

the stomach, and not of pulmonary origin, increased very much, coming on in violent paroxysms, and producing retchings, though not vomiting. These paroxysms were generally relieved by spiced wine, taken hot, in small quantities; which was now deemed necessary as a cordial.

Sunday, February 2d. Got up with a considerable increase of languor, having passed a feverish and almost sleepless night, and from this time was unable to leave the house.

This languor and debility continued to increase rapidly every day, as well as the cough, which was excessively harassing, and produced a distressing sense of binding and of immovable constriction across the region of the diaphragm; which, together with the continuing perturbation of the heart, rendered it necessary to remain in nearly an upright posture even during the night. So early as Wednesday the 5th, the depression had become very great; but a slight degree of vigour appeared to be restored on the following day by a more liberal use of spiced wine, a bottle of which was taken in the course of twenty-four hours, it having been found necessary to use it even during the night. The nights were now passed almost entirely without sleep, in consequence of the disturbed state of the circulation, and the constant harassing spasmodic cough, as well as from the distress

occasioned by painful distension of the stomach by flatulence.

Friday, 7th. On this night, from the difficulty of being supported in an erect posture in bed, and from a dread of the sufferings produced by any approximation to a supine position, or to lying on either side, it was determined to pass the night propped up on a couch in the drawing-room. No sleep was obtained, but in the course of the night the action of the heart became once more regular, in consequence of which the following day (the 8th) was passed with less suffering. On taking the nightly position on the couch this night, fell asleep, and slept quietly about an hour; awoke with a start and with a momentary confusion of mind, at the same time calling out, in apparent distress, for the admission of fresh air; on the return of consciousness, the irregular action of the heart was found to have recommenced. The extract of hyoscyamus, which had been taken on Thursday and Friday, the 6th and 7th, in doses, first of three, and then of five grains, was supposed to have quieted the action of the heart, and to have contributed to the intermission of Saturday; but it was taken three times during the night of the 8th, in doses of five grains each, without any obvious effect. The tincture of hop was then substituted and taken in doses of thirty drops every six hours until the 12th, without any other effect.

than the production of a slight drowsiness, which at length became considerable. Having found for some days past that the languor and debility were much increased in the morning, and obviously diminished by frequent supplies of food and cordials during the day, it was now deemed advisable to continue them during the night. This plan was begun on Wednesday the 5th; and on Sunday the 9th, the languor and debility being much increased after the return of the irregularity of the circulation, these supplies were ordered to be repeated every hour during the day and night; consisting of small quantities of jelly, beef-tea with rusks, chicken, hare, milk, &c. and the stimulant quality of the spiced wine was increased by the addition of a tea-spoonful of brandy, which was also occasionally taken alone, diluted with water. On going to the couch this night, a disturbed sleep of only a quarter of an hour was again terminated by a start and confusion, and by a still more importunate demand of fresh air, which was not satisfied till two windows and the door were set open, and the couch drawn into the current. No more sleep was obtained, and one window and the door were kept open till morning. The two following nights were passed without sleep, and with some violent paroxysms of coughing and retching, which were generally somewhat relieved by food and cordials; the admission of air being also from time to time necessary. On the night of Wednesday the 12th, having again obtained a short sleep, not

exceeding a quarter of an hour, awoke in extreme distress, with a sensation of sinking, which was felt as that of approaching dissolution; the anxious demand for fresh air was repeated, as well as urgent calls for brandy undiluted, which was greedily swallowed to the extent of three glasses in the course of five minutes, without producing much relief. Ammonia and æther were then substituted, one or other of which was repeated every ten minutes for about two hours, when the faintness rapidly declined, especially after a very copious discharge of limpid urine. During this paroxysm, notwithstanding the total depression of muscular power, and the feeling of sinking to immediate death, the mental powers remained clear, the extremities warm, and the pulse, though extremely irregular, and not according exactly in its beats with the contractions of the heart, was felt in all the extremities. About two hours afterwards, without any previous sleep, and although the windows and doors had remained open, a second and similar paroxysm of fainting occurred, in which the appearance of depression was greater, at least in the power of speaking, and which, after a similar administration of stimulants, gradually subsided in the course of two hours, leaving however a much greater degree of languor and depression than the former. It was now distinctly obvious, that the action of the heart and arteries, which was extremely feeble as well as irregular while awake, was so much more enfeebled during

sleep, as to be in fact almost suspended, and thus to occasion those alarming faintings and sinkings; so that it became necessary, notwithstanding the extreme drowsiness which had succeeded the long continued watchfulness, to interrupt the sleep at the expiration of two minutes, by which time, or even sooner, the sinking of the pulse and countenance indicated the approaching languor.

Thursday, 13th. The debility left by the two paroxysms of the preceding night was extreme, and it was still necessary both day and night to watch and interrupt the sleep every two minutes; this measure was necessarily continued for three weeks or more, during which period the length of the permitted slumbers was gradually increased, having reached five minutes in eight or nine days, and soon afterwards a quarter of an hour, still however producing similar paroxysms of fainting, more or less severe. The distress, indeed, accompanying these paroxysms, excited so much dread of indulging the overpowering drowsiness, that the most urgent requests were made by the patient for strictly watching and interrupting the sleep. In this state of debility the powers of the stomach seemed to fail rapidly; it became incapable of receiving the solid animal diet which had been hitherto so much relished. During the whole of this day and night, beef-tea only was used, a few spoonfuls being taken every half hour, sometimes with a rusk. To support the failing powers of

the stomach, a pill containing one grain of Cayenne pepper was taken every hour with some relief; after eleven or twelve hours it was discontinued. The painful and immoveable distension of the stomach from flatulence continued and even increased, and was particularly distressing in the nights, generally occurring, as well as the spasmodic cough and faintings, with unusual violence soon after midnight, and somewhat abating towards day-break. For the relief of this flatulence, peppermint-water, a small portion of brandy with hot water, and occasionally with half a glass of wine, were used; and on the recurrence of a disposition to faint, ammonia and sometimes æther were taken with advantage. But the most speedy and sensible relief under these extreme sinkings was produced by a musk draught, containing ten grains of that substance.

The first dose of this medicine appeared to diffuse its stimulating effects through the whole frame, exciting a sort of electric tingling, even to the extremities of the limbs, and an immediate feeling of renovated strength. The same effect was produced in a somewhat less degree whenever it was repeated, and being left as a sort of sheet-anchor, it was taken four times afterwards in the course of the ten following days, when the most alarming paroxysms of faintness occurred.

On Friday the 14th, on giving up the Cayenne

pepper, a warm decoction of bark was taken, with a view to support the powers of the stomach, which in a day or two was changed for a cold infusion of cinchona in lime water, which was at first more grateful to the stomach, but soon afterwards the extract in the form of pill was substituted for it. During the use of the cinchona the bowels became rather constipated, but were easily kept open by an occasional draught containing three drachms of tincture of senna, after enemata had failed. Beef-tea, from the constant repetition, being now loathed by the stomach, sago milk, rice milk, and arrow-root were substituted, and still taken every hour night and day, the flatulence and cough being much increased if the intervals were prolonged. This plan was continued till Monday the 17th, when an urgent desire being expressed for animal food, a small quantity of roasted pheasant was allowed, but not repeated, in consequence of the oppression and increase of flatulence which it occasioned, and which was followed by an increased disturbance of the action of the heart. During the night and the whole of the following day, the disturbed and feeble state of the circulation was so great, that the extremities became cold, and required the constant application of bottles of hot water; and the feelings of languor and approaching dissolution were unusually distressing. At this time too, an oedema of the lower limbs, which had begun to shew itself a few days previously,

also increased. The musk draught was taken this afternoon, and with considerable relief to the feelings of languor, though the effect was less sensible and speedy than before.

Thursday, 20th. The enfeebled condition of the stomach, and especially the immoveable flatulence which was accompanied with a sensation of globus, being rather increased, as well as the general debility, it was this day determined to give up all solid food and medicine, and to limit the diet to asses' milk, to the extent of a quart daily, taken alternately every hour with cows' milk, into which a small quantity of tops and bottoms was occasionally broken. The benefit of this change in the ingesta was most sensible, for immediately the flatulence began to subside, and the harassing cough to diminish ; and from this time a progressive, though very slow improvement of the strength and all the other symptoms took place. The stomach regained its power by very slow steps ; this liquid diet was continued for about a week, when a little rice or sago was added to the milk ; in a few days more, rice, bread, or light flour puddings was taken occasionally at some of the hourly meals ; and on Monday the 4th of March, for the first time a little whiting was eaten, but produced immediately considerable oppression and flatulence, which was followed by a violent beating of the heart, without irregularity, but at the rate of 160

contractions in a minute, and which continued without intermission for a fortnight. It was remarkable, that during this period the arterial pulsations, which, as was before observed, were occasionally not synchronous with those of the heart, were now almost uniformly just half the number, the heart beating twice while the pulse in the extremities beat once. When this was not the case, the pulsations of the arteries were again different in number and strength from those of the heart. This disturbance of the digestion and of the other functions from the use of the fish, rendered it necessary to restrict the diet still to milk and puddings, and it was only by very slow and gradual steps that the stomach became able to receive more solid food, proceeding from pudding to eggs, and from these, in about ten days, to a small portion of chicken once in twenty-four hours, and after a few days more to a mutton-chop, &c. the first use of any article of diet more solid than the preceding being always attended with some oppression and flatulence. It was also by the same slow progression that the stomach became capable of sustaining longer intervals of abstinence, acquiring gradually the power of fasting two hours, in the course of about three weeks from the commencement of the milk diet, but requiring food in the night till the end of April. The state of the circulation and the muscular strength have been still more slow in their progress towards re-

covery; the necessity of maintaining an erect posture even during sleep, in consequence of the extreme disturbance of the action of the heart, and the sense of anxiety and oppression which the least inclination to the supine posture produced, remained six weeks, and six weeks more elapsed before a complete recumbent position could be resumed; and it was still longer before the power of lying on either side was regained, and before the pain and constriction in the region of the diaphragm, which had been the source of the most severe sufferings in the earlier stages, were sufficiently removed to admit of a perfectly erect posture in walking. Even now, on the 22d of July, the pulse has almost uniformly continued at the rate of 96, and the action of the heart is easily hurried, and even slightly disturbed in its regularity, by any sudden exertion or emotion. All the functions seemed to have regained their healthy condition, with the exception of the circulation and the muscular strength; weariness and aching of the limbs being produced by very small exertions in walking.

It may not, perhaps, detract from the authenticity of the details of this case to add, that it occurred in the person of the narrator, who, at the time of presenting these notes, Jan. 20th,

1818, (one year after the attack,) continues slowly regaining his muscular strength, the circulation being hurried, and lassitude and aching of the limbs induced by very moderate exertions in walking, and the pulse at all times exceeding 80 beats in the minute.

ON THE EFFECT
OF
NITRATE OF SILVER

ON THE
COMPLEXION.

By DR. BADELEY,
OF CHELMSFORD.

COMMUNICATED

By SIR HENRY HALFORD, BART.

Read Feb. 17, 1818.

ON reading the last Volume of your valuable Transactions, I was much pleased with seeing so many cases of successful treatment of epilepsy by argentum nitratum. They excited more than usual interest with me, from the peculiar dark colour of the skin agreeing exactly with one lately under my care. As the similar cases published by Dr. Roget are chiefly in foreign countries, and my patient is in this neighbourhood, retaining his saturnine colour, and willing at my request to wait upon the members of your Society for their inspection, I thought the case might be acceptable

to them. His name is Stephen Martin, of the Society of Friends, a young man about eighteen years of age, sensible and temperate. He had always good health till he was attacked with these fits. The first was previous to his leaving school, at the age of fifteen. From that time they returned at uncertain periods; but generally about three or four weeks. He could assign no reason for them; but they appeared to me to originate in the stomach: he had great acidity there. This symptom has always been so prevalent in those cases of epilepsy which I found curable, that it always gives me some hope of success. One of the nuns at a convent in this neighbourhood never went to sleep for some years without having a fit. She had acidity to the greatest possible degree, and said she could compare it to nothing but vitriol: it affected her teeth. This lady, from having fits every night, now has not one oftener than twice or thrice in a year; but I cannot ascribe this approach towards a cure solely to the Nitrate of Silver, because she took magnesia every night, and lime water twice a day. It however strengthens my hope of success when I meet with great acidity in cases of epilepsy, from the probability that the cause is then seated in the stomach.

As there was nothing uncommon in Martin's fits, I need not trouble the Society with a particular description of them. They left a violent pain in the head, and particularly in the eyes,

which continued the next day. Between the fits, and sometimes on their approach, he felt (to use his own words) "sensations, like flashes, or quick passing vapours behind his eyes, followed by a bewildering feeling, with a violent pulsation in his head, and a temporary deprivation of sight, so that he could see only a small part of an object at a time." These sensations were removed with the fits by the use of Argentinum Nitratum, *unassisted*, after leeches, blisters, emetics, mercurials, bark, steel, zinc, valerian, and turpentine had failed. The turpentine he soon discontinued, from the violent irritation it excited in the bladder. The Argentinum was taken in doses of a grain to a grain and a half, three times a day, made into pills with crumb of bread, and continued a year and a half. By this alone the fits gradually lessened in frequency, till they entirely left him.

I have found it successful in other affections of the head, in which I was induced to try it, from their seeming approach or propinquity to epilepsy. In all these cases (four in number) it operated briskly on the bowels, producing four or five motions in a day. In Martin's case it did not; but I have found it generally most successful when it purged. These cases were all attended with very great vertigo; and bleeding, both general and local, emetics, blisters, and (what seems extraordinary) purging by other medicines, had produced no good effect. It was remarkable, that in one of these cases, a

young man, who was very weak, partly from evacuations, and from having no appetite, although he had four or five motions from his medicine, they did not increase his debility; and he begged of me not to check them, as he felt himself daily getting better. This man had been frequently purged by other cathartics without the least benefit.

Martin's case, added to those published by Dr. Roget, proves the efficacy of the Nitrate in many cases of epilepsy, when taken with patient perseverance in small doses; and its failure I have thought probable, in as many, from the doses having been increased too fast and discontinued too soon. The dark colour in Martin's skin did not make its appearance till some months after the fits had left him. As there had been no return of his complaint, I had not seen him for a quarter of a year; but upon calling, as I passed through the village, his mother desired me to observe the alteration that had taken place in his complexion. Not having then seen, or read of a similar effect from that medicine, and having given it in such small doses, I did not impute it to that cause. Indeed, the disease being cured, I paid little attention to his colour, till I read the cases published by Dr. Roget in your seventh Volume. These induced me to take an early opportunity of calling again, when I found the dark colour of his skin very greatly increased, although he had discontinued the Nitrate of Silver six months. It is now

near two years, and his face still retains the leaden colour : his bosom rather darker, with a purple hue ; the roof of his mouth, inside of his cheeks, and back part of his tongue dark ; the tunica sclerotica much discoloured. As blisters on negroes rise white, I applied two to Martin, and found they did the same, which, I think, proves the seat of the colour to be in the rete mucosum. He has been now perfectly free from any symptom of epilepsy during two years and a half.

As the Nitrate of Silver is so diffusive, and extends its effect to every part of the surface, may it not be beneficial in some cutaneous diseases ? or be made, by combination, the conductor of some medicine more efficacious than itself ? Might we not make one medicine the vehicle of another, through the medium of air, more frequently than we do ? Medicated air is seldom used except to correct that which is mephitic ; but as all medicines naturally impart their virtues to the air when exposed to it ; why should we not more frequently make use of what nature takes every opportunity of so liberally offering ? We know that turpentine quickly communicates its odor to the urine of a person sitting in the same room with it ; and many painters have told me, that they do not feel the pernicious power of lead when they paint with it unmixed with turpentine, but soon feel its deleterious effect when united. A maid-servant of mine lost her speech and became paralytic from be-

ing six hours in a newly-painted room, but quickly recovered upon being removed. If then turpentine so soon convey the pernicious power of the oxide of lead, may it not in like manner be made the beneficial conductor of the oxide of mercury? May not children, and patients who cannot or will not admit mercury in any other mode, receive much benefit in many diseases by sleeping in rooms, the air of which is strongly impregnated with turpentine, or with æther, loaded with mercury?

I beg pardon of the Society for deviating from the original subject of this paper; but I wish to call more attention to this neglected part of the practice; and it is no weak argument in its favour, that administering medicines through the medium of air, will be inlisting so many more auxiliary *light troops* into the service, without superseding the use, or interrupting the march, of the *heavy artillery*.

CASE
OF AN
EXTENSIVE WOUND
FROM THE
BITE OF A SHARK.

BY DR. KENNEDY.

COMMUNICATED

BY SIR JAMES MACGRIGOR.

Read March 31, 1817.

Manaar, 22d February, 1817.

THIS day, about 4 P.M. while sitting in my veranda along with Lieut. Tydd, the officer in command of this station, a man was brought to me in a palanquin, accompanied by the agent for the Renter of the Chank Fishery and a number of his people. We were given to understand that the man had been bit by a shark, and from the lamentations and supplicating signs of those about him, we were led to conclude that he must have suffered severely.

He was lying on his back in the palanquin,

seemingly in great agony, having a cloth wrapped round his body where he was bit, which, to save him the pain of being moved, I had cut across, which brought into view the front part of the wound. The abdominal muscles of the left side were cut asunder and turned back, exposing the colon in its passage across the belly, and several other convolutions of the small intestines.

Seeing this state of things, I did not think proper to delay by any farther examination here, and had him conveyed immediately to the hospital. Having given directions for the necessary dressings to be prepared, and having had him removed from the palanquin to a cot, (which was accomplished with considerable difficulty,) I was more at liberty to examine into the state and extent of the wound.

It appeared that the upper jaw of the animal had been fixed on the left side of his belly, forming a wound of nearly a semicircular shape, of which about one inch on the left side of the umbilicus was the *upper*, the lower part of the upper third of the thigh the *lower* extremity, and an inch behind the trochanter the centre. The abdominal and lumbar muscles were divided and turned up, exposing the bowels as before stated, and laying bare three of the lowest ribs; the gluteal muscles were lacerated and torn up; the tendons about the trochanter divided, laying bare that tuberosity; and the vastus externus and part of the rectus

muscles of the thigh were cut across. The lower jaw of the fish had been fixed in the muscles of the right side of the abdomen, forming a segment of a circle between the umbilicus and an inch above the pubis; the teeth of this jaw, however, had only individually penetrated the muscles, without producing any division or laceration of the parts. The wound of the left side measured in length nineteen inches; in breadth, where the abdominal and lumbar muscles were lacerated, between four and five inches; below this and above the trochanter two; and at and below the trochanter three and four inches.

The accident had occurred about one o'clock, at the mouth of the river, (a distance of five or six miles from the port,) while he was employed at his business as a chank-diver. It would appear from his account, that the shark caught hold of him as he was hawling up to the boat with his load of chanks, and was only prevented from carrying him off by his body being fastened to a rope with which he was pulled up. The resistance made by the trochanter to which the teeth of the upper jaw had pierced but could not penetrate, certainly prevented that part of the body in his grasp from being taken away.

Conceiving that some portion of salt water might have entered the cavity of the abdomen while he was dragging up, I had him turned as gently as

possible on that side where the opening was, and with a soft sponge removed any moisture that was present. This, however, was not great in quantity, and the little there was being bloody, I could not distinguish it from any other exudation. Having then cleaned the wound from clotted blood, and having removed the hair from the sides, I closed it as well as I could by throwing straps of adhesive plaister around the body, and crossing them over the edges on each side ; after which a light dressing was applied, and a many-tailed bandage thrown over the whole.

What from the loss of blood, removing from the boat into the palanquin, from the palanquin to the cot, and dressing, the poor fellow was much exhausted, and complained of being sick and faintish. A glass of wine was given him, with a few drops of laudanum and ether, which revived him a little.

In the evening about nine o'clock I visited him and found him considerably feverish, and from his having had no stool for the two last days, I was induced to give him a glyster, which produced one motion immediately, and another during the night.

On visiting him in the morning I found him still feverish, having had no sleep all night, and complaining greatly of the pain about that part of his

belly which was torn ; his pulse was quick, and he was hot and thirsty. I took some blood from his arm, and ordered him to have congee with cream of tartar for drink.

Evening of the 23rd. Has been hot and feverish all day ; is now very low, restless and uneasy, and still complains of the pain about his belly ; has had no stool to-day. If he has no stool during the night, to have ʒvi of Epsom salts early in the morning.

24th. Took the salts early, from which he has had no stool ; no rest during the night, but seems more composed, although in addition to the pain in his belly he now complains of pain in the whole course of the wound, particularly about the trochanter. To continue his congee and acid for drink, and to have a little sago with wine.

Evening. Removed the outer dressings, and changed the straps about the abdomen and loins which had slipped ; feels easier since. If he has no stools during the night, to have ʒss of castor oil early in the morning.

25th. Has had no stool, although he has taken the castor oil ; slept none during the night, and seems very much dejected ; has had the Padre with him, and seems to despair of getting well. The people who visit him, by their lamentations and

howlings, seem to encourage him in this idea. I have therefore debarred all except his own brothers and the agent from coming to see him. Repeat the castor oil immediately.

Evening. Removed all the dressings; the wound looks well, and has united in several places; about the abdomen and in the neighbourhood of the trochanter and downwards, however, no union has taken place, and the discharge is thin and brown; cleaned and dressed as before.

26th. Has slept a little for the first time during the night; ordered his body to be sponged with soap and water, and his clothes changed, after which he felt comparatively comfortable; still complains, however, of pain about his belly, but does not refer it more to the internal than to the external part of the wound. To have \mathfrak{z} ss of Epsom salts, and to use the rice water without the acid.

Evening. Had a stool from the salts, but fears he will not get any sleep during the night. To have an opium pill at bed-time.

27th. Slept some in the forepart of the night, but dreaming that the shark had a hold of him, he awoke in a fright, and did not go to rest again. To have his congee with acid, and his wine and sago continued.

Evening. Renewed the dressings; the wound improves, and the discharge is good at every point except at the trochanter, (through the periosteum and perhaps a little way into the body of which the teeth of the shark seem to have penetrated,) and at the opening into the abdomen; and from the encouraging hopes I have now given him, he seems much elated; and expresses a greater anxiety to live than he has done before. To have his body sponged with warm vinegar and water, and his clothes changed at bed-time.

28th. Has passed a comfortable night, and looks comparatively cheerful this morning, and for the first time since the occurrence of the accident desires to have something to eat. To have chicken soup made for dinner, and his sago and drink continued.

Evening. The chicken broth not sitting on his stomach, he had a little mild curry made which he took with some rice for dinner; had a stool in the afternoon, and appears now composed and easy; he has still a slight accession of fever in the evenings, but the pain about the abdomen is much abated. To have his feet sponged with warm water at bed-time.

March 1st. Changed the dressings this morning; the wound still improves, and a partial union

has taken place between the abdominal and lumbar muscles : strapped with inch-straps of adhesive plaister over the edges of the wound only, instead of round the body, which method was afterwards continued. From this period there was little variation of the symptoms and treatment ; the principal objects I had to attend to being the encouragement of slow, and the reduction of exuberant granulation over the whole, and endeavouring to close the opening and correct the discharge of the abdominal wound. To effect this last, it was necessary to administer small doses of bark internally, and this wound was gradually closed by strapping over a double compress, and stimulants applied to the edges of the opening. His health, which at first had sunk much, improved rapidly, so that on the 13th of March, (on which day I left Manaar, being under orders to take charge of the district of Chilaw,) I saw him moved for the first time from his cot, and with the assistance of his brothers, walk about a couple of yards and sit down on a chair, in which position he seemed much pleased to shew himself to me ; and having told him that I considered him now out of danger, and that I was going off, he put his hands on the arms of the chair, and raising his body in the best way he could, with tears of gratitude in his eyes, made his salem in a manner which I shall never forget.

The opening into the abdomen had perfectly

closed about three days before, and the body of the wound had united, although the surface had not yet skinned over, and which of course only attention and time could accomplish.

I left him in charge of Mr. Mathias, the sub-assistant of the Garrison, (who attended him along with me from the commencement,) with instructions what to do, and directions to forward to me a statement of his progress and improvement. Soon after my departure from Manaar, however, Mr. Mathias fell ill of fever, and was obliged to remove to Jaffnapatam, where he has remained unwell since. I have therefore been prevented from obtaining any farther account of this man, except what I have from my friend Mr. Tydd, who, in a letter I received from him about a month ago, informed me he was doing well; and having this day* received a letter from him in which he does not mention any awkward occurrence having taken place with respect to my patient, (although he knows I am interested in him,) I am led to conclude that he is now well, and likely long to bear about with him on the shores of India a striking example of the benefit of British surgery.

JOHN KENNEDY,

Assistant-Surgeon 1st Comp. Regt.

* 16th May 1817.

A REPORT
OF THE
PRINCIPAL DISEASES
WHICH OCCURRED
AMONG THE GENTLEMEN CADETS
IN THE
ROYAL MILITARY COLLEGE,
AT
GREAT MARLOW, BUCKS,
AND
SANDHURST, BERKSHIRE,
DURING A PERIOD OF SEVEN YEARS,
VIZ.
FROM 3rd OF SEPTEMBER, 1809, TO 2nd OF SEPTEMBER, 1816,
By N. BRUCE, Esq. A.M.
SURGEON TO THE FORCES, AND TO THE ROYAL MILITARY COLLEGE.

Read March 17, 1818.

BEFORE commencing a Report of the Diseases of the Gentlemen Cadets of the Royal Military College for the period comprehended in this memoir, it may not be deemed unnecessary to give a short description of the nature and economy of the institution itself, which are not perhaps generally known.

The Royal Military College consists of two departments or branches ; viz. a senior and a junior. The former, now stationed at Farnham in Surrey, was instituted for the instruction of a certain number of officers from the army in various parts of military science.

The junior department, or that branch of the College to which this Report solely refers, was founded for the education and discipline of young gentlemen designed for the military profession, who, after residing a certain period in order to attain the necessary qualifications, enter as commissioned officers into the regular army. From the difference of their respective capacities, therefore, as well as other causes, the time of their stay at the institution varies, but does not very usually exceed a term of three years. They are admitted into the College between the age of thirteen and fifteen years ; so that from this, as well as the reason just mentioned, their respective ages in the course of their residence differ very considerably, that is to say, to the extent of sometimes more than five years ; while their proportionate statures vary still more.

The Cadets are divided into companies, each of which is under the separate care and military direction of a captain. They are in an uniform manner dieted, clothed, and trained to the use of

arms and military exercises according to the usages of the British army. It may therefore be reasonably presumed, that such a regular system of discipline and economy would produce some corresponding influence upon their health, their constitutions, and in some measure upon the character of their diseases; and it is probably in this view alone that the Medical Report of the institution can be considered in any degree interesting, or deserving the attention of the Society.

When the junior department was formed in the year 1802, the town of Great Marlow in Buckinghamshire was chosen for its residence; a place objectionable, not only in regard probably to healthiness of situation, but on account of many local inconveniences. This spot, however, was fixed upon, as would seem, only for a temporary station, until a new College should be built upon ground purchased in the parish of Sandhurst, Berks; yet it was not until the autumn of the year 1812, that this great edifice was prepared for the reception of the members of this department.

The present Medical Report commences in the month of September 1809, at which time the writer first took charge of the medical duties of the institution, and ends in the same month of the year 1816. Consequently, it comprehends the diseases

of the last three years at Marlow, together with those of the first four years at Sandhurst.

Although the Table exhibits only the diseases of the Cadets who were placed under hospital treatment, having no reference to slighter complaints which did not call for confinement, nor to the diseases of the other numerous members of the College, it will nevertheless furnish a pretty accurate, as well as comparative view of the health of the institution, and the salubrity of Marlow and of Sandhurst for those respective periods.

In regard to Cadets with slight complaints requiring surgical treatment, it has been a general rule to admit into hospital only those patients who were prevented from walking, (through lameness or other injury,) or from using a pen or a pencil at their studies, and whose complaints required some degree of restraint in diet or exercise.

The station of Great Marlow, in several respects, appeared unfavourable to health. Surrounded by a well-wooded and beautiful country, with varied scenery, the town is enclosed almost on every side by hills, and lies close to and almost on a level with the river Thames, which, washing it on the south, frequently overflows its banks, and inundates the adjacent fields. The poorer class of inhabitants is seldom entirely free from

the ravage of some epidemic or infectious disorder ; and their own wretched condition, as well as that of their crowded and dirty habitations, is very favourable to the generation and retention of contagion. Hence some of the numerous members and persons connected with the institution, from their frequent and unavoidable intercourse with the townspeople, became more or less liable to imbibe the prevailing contagion in the place, and to communicate it to the individuals of the College ; thus constituting a fruitful and almost never-failing *fomes*, and a medium of infection.

The means of accommodation for the Cadets, as well as many others, at Marlow, were very defective. From the want of sufficient room in the College, other houses were necessarily hired in various and even remote quarters of the town. In addition to these, a temporary wooden building had also been erected previous to 1809, capable of holding one company of Cadets. This dispersed state of the lodging-houses was, no doubt, the means of greatly exposing the young men to the probable risk of contagion, and also to the inclemencies of the weather, in their passage through the streets from and to their dormitories and the halls of instruction in the College.

These circumstances it is thought right to mention, inasmuch as they may be supposed to have

increased the number of causes, and tendency to disease among the Cadets at Marlow.

At the time of the first occupation of the College at Sandhurst in October 1812, the buildings had not been long completed, and some parts were scarcely finished. The grounds were wet and miry, the roads unformed, and the local circumstances altogether very unfavourable to health.

The aspect, scale, and general commodiousness* of the building itself, appear to be very judicious and creditable to the talents of the architect. The front area, however, is narrow, and being confined by a pedestal wall excludes a great portion of light and warmth from the rooms on that side of the basement which are occupied by servants.

The immediate site of the College is moderately elevated and dry. An open and extensive heath almost surrounds it, particularly on the north and east, where it stretches for several miles. On the south-west, the building is in a small degree sheltered by trees. The air is reckoned dry, and in winter the wind, especially when it blows from the north and east quarters, is felt with much force and keenness. In the hot months of summer, the reflexion of

* The dormitories are constructed to hold five Cadets each, and to hold seventy-two square feet to every bed, and thirty-six cubic yards of space or air to each Cadet when the room is fully occupied.

the solar rays from the light sandy soil would sometimes be oppressive, were the effect not counteracted by an almost constant and refreshing breeze.

The remoteness of the College from other buildings gives it the superior advantages of ventilation and an immunity from contagious disorders, comparatively with the first station at Marlow, as will appear by an examination of the Table of the diseases which appeared at both places in the respective periods mentioned, that is to say, for three years at Marlow, and four years at Sandhurst; but it is to be observed, that at the latter place the general average proportion of Cadets was nearly one-twelfth part greater than at Marlow; and the Table includes the diseases of *four* years.

The number of Cadets at the institution has varied at different times, but has never exceeded 360 at one time. Their diet, clothing, and military discipline, as already observed, are strictly uniform; and it is perhaps to the steady operation and effects of this system, and to the unremitting vigilance and attention of the governors, and indeed of every officer of the institution, to the health, comfort, and regular conduct of the students at so critical a period of their lives, that is principally to be ascribed their freedom from more numerous and more dangerous maladies than those which usually occur amongst them.

The early detection of their individual disorders in most cases, and the opportunity so readily presented to the medical attendant, not only of placing the patient under immediate treatment and restrictions in diet, but also of hourly watching the progress of the disease and the effects of the remedies prescribed, are advantages more peculiarly calculated to afford to art a better chance of averting the danger and cutting short the malady. Certain it is, that under ordinary conditions the disorders of the Cadets seldom assume a very dangerous or aggravated character, and owing partly to these favourable circumstances, and probably in part to the youthful vigour of their constitutions, the progress towards the re-establishment of their health is usually rapid.

Independently also of the salutary effects of regular diet and discipline upon the constitutions, and possibly upon the minds of the Cadets, they are permitted to indulge in the usual athletic exercises of youth; and it has often been remarked, that young men of weakly constitutions at the period of their entrance, have become comparatively tall and strong after a residence of only a twelve-month at the College.

There are two vacations in the year of six weeks each, at which times only a small number of the Cadets continue at the institution. In calculating

the proportion of diseases, however, the ratio of sickness is taken only from the mean numbers actually present in each month of the year.

It is also right to state, that the Report does not comprehend the diseases of those young men who fell ill, or may have died, while absent from the College. Such of the sick as were permitted to return home for change of air, or at the request of friends, are pointed out in a separate column of the Table.

Fever.

This may be considered as the most important class of diseases in the catalogue. Under this head are meant to be included all cases in which acceleration of the pulse, increased temperature of the skin, preceded by the usual well-known symptoms, were the predominant phenomena, without the *manifest* presence of primary local affection. It is thought unnecessary to give a detail of the general symptoms, many of them being common to other diseases.

As the greater proportion of febrile cases were of a mild character, and required but a very short period of confinement in the hospital, being seldom more than two days, it has been judged proper to distinguish the more simple and slight affections of this kind under the term *febris mitior*;

while all the other more serious forms of fever, (intermittents and the exanthemata of course excepted,) to avoid minute classification, are comprehended under the general appellation of *febris continua*.

In the more severe cases of fever which occurred, the symptoms very nearly agreed with the usual definitions of synochus of nosological writers. There appeared no rational ground for supposing that fever was, in any instance, derived from the agency of contagion; nor did any case, even the most severe, ever assume the true character of typhus, as usually described—a disease which seems to be now becoming more rare.

In every case of fever, the first step in the treatment was the evacuation of the contents of the stomach and bowels; not according to the usual understanding of this indication, by the milder class of remedies; but by means of powerful medicines, *early* exhibited, and repeated until they produced a complete effect. Tartarized antimony, dissolved in water, was always preferred as an emetic; and sometimes it was given in combination with ipecacuanha. These medicines were administered with the view of causing a sufficient evacuation of the contents of the stomach, and to produce a more direct and emulgent effect on the other viscera. As soon as the stomach was sufficiently composed to retain them, purgatives of the

submuriate of mercury, in combination with jalap, compound extract of colocynth, assisted by super-tartrate of potass, neutral salts, or infusions of senna, were administered, so as to produce, if possible, from five to eight or ten alvine evacuations within the first twelve or fifteen hours after the patient's admission, according to the urgency of the case. To accomplish this object, from six to twenty grains of the submuriate, and from fifteen to sixty of jalap, according to the age, size, and constitution, exhibited in two or more doses, have in many cases been found necessary, with the additional assistance of neutral salts and infusions of senna. The usual dose of calomel was six or eight grains. In most instances, where the vascular action ran very high, the effect of the purgative medicines was anticipated and promoted by the use of large saline enemata, which were also repeated, if necessary: these last, by relieving the great intestines of their contents before the action of the cathartics had commenced, were found materially to accelerate their operation, and to save time, a point of primary consideration in the early stage of fever.

The employment of these evacuant remedies, especially the aperients, is here more particularly described, and their early and faithful exhibition insisted upon, because they are considered to be very important in the final success of the case, and because the successful termination of the dis-

ease so much depends upon the timely and vigorous use of the means directed. These means should be put in force, as far as possible, *under the eye of the medical attendant himself*, who can never confidently and safely rely upon the reports of nurses or other uninterested persons in any cases of dangerous tendency.

By a steady use of these measures, an abatement of the heat and vascular excitement was most generally perceptible within twelve hours after admission. When this favourable change was not very remarkable, the cathartics were repeated, the patient being allowed, if necessary, such an interval of repose as was deemed consistent with his safety and the particular state of his sensations at the time. In the administration of these medicines, regard was paid to the evacuant effects produced, to the age and strength of the patient, and not so much to the quantities of the medicines exhibited; and the remission of the febrile symptoms appeared, in most instances, to be in direct proportion to the action of the purgatives. It was also remarked, that repeated active doses of these medicines, so far from inducing debility, too often and too groundlessly dreaded in such cases, have commonly procured to the patient relief from the severity of his sufferings, and an apparent renewal, as it were, of the strength and energies of the system.

When very decided benefit was not found to arise from the full operation of aperient medicines after the lapse of twenty-four or thirty-six hours ; and when febrile action had been *entirely* established, whether through the patient's concealment and loss of time in attacking the disease at the first onset, the inefficacy of the treatment hitherto adopted, or some other cause ; it has been usual to make a very strict re-examination of all the individual symptoms of the case, when not uncommonly some topical inflammation or affection either of the head or in some part of the thoracic or abdominal cavities has been detected, from the presence of head-ach or giddiness, pain in deep inspiration, or on pressure with the hand in the different regions of the trunk. The discovery of this new or overlooked symptom has generally suggested the expediency of using the lancet ; or if that remedy was not deemed necessary, local bleedings, blisters, or other topical applications, according to the nature and urgency of the particular symptom. In all cases attended with unequivocal marks of local complaint, whence organic congestion or lesion might be apprehended, the employment of this remedy was found of essential advantage ; and probably it should often take the precedence of every other remedy in fever of any serious form, especially in hot weather, or in the spring months. The extent of the venæsection was regulated by the effect produced upon the pulse, but particularly upon the relief of the local

symptom, and very seldom by the measured quantity of blood absorbed, which was usually from ten to sixteen ounces at once. Even in forms of fever unaccompanied with well-marked topical affection, which had not yielded to the active medicines previously administered so much as might have been expected, and in which the strength and frequency of the pulse seemed to indicate inflammation to exist *somewhere*, bloodletting has been repeatedly followed by an evident relief of almost all the symptoms. In such cases, when carried far enough to produce a very sensible impression upon the general system, this powerful remedy, by its immediate effect of reducing the volume and momentum of the circulating mass, and thus counteracting local congestion, at the same time that it commonly abates the quickness of the pulse and the cutaneous heat, has seemed to open the way towards a more favourable crisis, and bring about a speedier termination of the disease. Sometimes it was deemed advisable to repeat the venæsection in instances where the local symptoms had returned or had been little affected by the previous bloodletting; more especially if the appearance of the blood did not forbid farther abstraction of that fluid*.

* The practice of blood-letting in fevers, which, when copiously employed at the very beginning of the disease, has been found so successful in the cure of the destructive fever of the West Indies, as well as in other parts of the world, has been zealously recommended and practised by no author more than Dr. Jackson. Drs. Moseley and Rush have also strenuously sup-

When some of the means here described have failed to arrest the progress and prevent the establishment of febrile action, and it has become evident that the disease must now, as it were, run its course; small and frequently repeated doses of the submuriate of mercury, in the quantity of seldom more than two grains, given every four or five hours, in conjunction with the antimonial or James's powder, without opium, have been usually had recourse to; and when found necessary, these were joined or alternated with sufficient quantities of cathartic medicines, so as to keep up daily copious evacuations. In the intervals, and indeed at all times, saline effervescing draughts, and drinks acidulated with the supertartrate of potass, tamarinds, &c. were almost always permitted to be freely taken, as grateful auxiliaries to the medicines, at the will of the patient.

These remedies were continued, at longer or shorter periods of time, every day during the further progress of the fever, or until very decided amendment followed, which usually took place in the course of a very few days.

In regulating the doses and the times of exhi-

ported the same doctrine. Bleeding, however, had been long sanctioned in tropical fevers by Trapham in 1678; by Towne in 1726; and by Hillary about the year 1760; so that, in this instance, tropical practice may be said for some time to have retrograded.

biting the purgative medicines, the degree of fever, as well as the appearances of the alvine discharges, afforded a very convenient and useful criterion ; an attention to which point by the medical attendant cannot be very safely omitted in practice.

As an essential thing in the treatment of fever, it may be also right to state, that particular regard was paid to the preservation of a due degree of temperature in the apartments as well as in the beds of the sick at all seasons of the year, either by the admission of cool, or the exclusion of the external air, according to the feelings of the patient, the state of the weather, and by a regulated proportion of fires and bedding.

Such has been the principal mode of treatment commonly adopted in cases of fever, and almost in every instance the relief and apparent success obtained were proportionate to the *early* and *vigorous* employment of the measures above described; and it may be remarked in general that no instance of relapse ever occurred.

It is thought unnecessary to describe the other auxiliary means employed in the treatment of fever, as comparatively unimportant, with the exception of the external use of water. The cold affusion, however, *duly administered*, being a remedy of great consideration in febrile cases in general, it

may be right to take some notice of its effects in continued fever, as it appeared among the Cadets.

In many instances of steadily increased temperature of the skin, the affusion of two or three successive pailsful of cold water, or of water impregnated with salt or vinegar, was carefully performed in the manner described by Currie, but the results were by no means so beneficial or satisfactory as might have been expected, either in cutting short the disease, or in permanently removing any of the symptoms. Whenever this remedy was tried, it always reduced the heat and febrile anxiety, and frequently the strength and quickness of the pulse, for a longer or shorter time; sometimes also producing a tendency to repose; but the consequent reaction of the heart and arteries was very generally attended by a return of the symptoms to the same, or nearly the same degree of urgency as before the affusion. The patient, however, was, generally speaking, much refreshed by it; and although it did not effect any permanent good, it afforded him a respite from feverish heat, and was so grateful to his sensations, that he sometimes earnestly requested it to be repeated.

Sponging the body generally or partially with subtepid or cold water mixed with vinegar, according with the temperature of the skin and the feelings of the patient, was, under similar circumstances, always found to agree with him, and to

abate that restlessness and anxiety which so invariably accompany high degrees of fever.

These agreeable effects, more or less, followed the use of the cold or subtepid affusion and lavation ; but whether from the peculiarity of the diseases, or of the constitutions of this class of patients, in no instance of continued fever was the malady extinguished or obviously cut short by any of these processes ;—results which had been repeatedly witnessed by the writer of this Report in other subjects of fever, placed under different circumstances of age, diet, habit, manner of life, &c. in warm as well as temperate climates, at sea as well as on shore ; and demonstrating that the remedies chiefly to be relied upon in the cure of these fevers of the Cadets, are early and copious evacuations, particularly bloodletting and cathartics, the latter being in every case most indispensable.

Having now described the practice which has been generally pursued at this institution in the treatment of continued fever, it may be proper, with a view to practical utility, to take some retrospective notice of the febrile cases which ended fatally.

The total number admitted was 432. Of 162 admitted with the more severe form of continued fever, two cases died. The first death occurred

at Marlow, during a hot season, in the month of June 1811, on the twenty-eighth day of the disease. Besides the unusually long duration of the malady, this case presented several remarkable features. The patient, who was sixteen years old; never complained of headach; the skin was obstinately hot and dry throughout the whole course of the disorder, accompanied for some time with a small pearly eruption on the body; the pulse, at first 108, afterwards ranging to 140 and upwards in the minute; redness and swelling of the tongue; and in the earlier stage, a sense of uneasiness on pressing the hypogastrium, with some degree of tension of the part. This patient had been indisposed two or three days before he reported himself sick, and was of a delicate appearance. The cold affusion was repeatedly tried to the fullest extent, without producing any permanent advantage. It is now almost to be regretted that the lancet was not employed, notwithstanding the circumstances which at the time appeared to forbid the use of this efficient remedy; and probably the reasons which then seemed to contra-indicate bloodletting were not well founded*. Purgatives were freely

* It is perhaps right to state, that in the treatment of this, as well as of every other case of extreme danger, the writer availed himself of the opinion and advice of the most eminent physicians in the vicinity of the institution, with whose full concurrence and recommendation the treatment has been conducted, in joint responsibility and co-operation with the medical officers of the establishment.

administered, not only at the beginning, but during a long period of the disease; and principally with this view, besides the other purgatives, upwards of fifty grains of the submuriate of mercury were given in all; but the mouth was not affected, probably from its not having been used in greater quantity. It may be here remarked, that the effects of mercury in cases of fever were scarcely ever perceptible on the mouth; indeed it was very seldom or never thought necessary to carry the medicine so far as to be likely to induce ptyalism, without symptoms of amendment having most generally taken place in the patient. The body of this patient was not inspected.

The second fatal case of fever took place at Sandhurst, in the latter end of May 1816, at a time also when the weather was uncommonly hot for the season. The disease was marked by constant but slight headach from the very commencement, in which respect it differed from the case before-mentioned: there was little increase of heat, or in the frequency of the pulse at the first. So insidiously mild were the symptoms for the first ten days, that the patient was considered nowise in danger. The pulse was small, usually about 84, seldom exceeded 90, and at one time, viz. on the ninth day, was only 72; the temperature of the skin during the whole time being very little above the natural standard. In the evening of the eleventh day, delirium very unexpectedly came on,

followed by coma and other symptoms of inflammation in the brain, the pulse in a short time rising to 140 in the minute. The early and *liberal* use of purgatives, perhaps, served greatly to keep down febrile action, and seemed to have suspended the now evidently strong disposition to congestion in the vessels of the head, partly by their effects upon the circulating mass in general, as well as by mechanically facilitating the descent of the blood by the aorta and iliac arteries. The headach, however, still continued, and blood was taken from the temples by means of leeches. The patient expressed himself relieved, but this relief was but temporary. Delirium now for the first time commenced. Great universal irritability and coma successively followed, symptomatic of metastasis to the brain. A larger quantity of blood was now taken from the temples, and blisters were applied both to the head and nucha. The coldest applications were assiduously used to the head, such as ice, æther, vinegar, &c. while powerful cathartics and stimulating enemata were also administered. At this time the patient was in an exceedingly perturbed and comatose state, the pulse so small and rapid as scarcely to be numbered. Death, in short, seemed now inevitable; but on another consultation it was determined, as a last resource, to use the lancet. The right external jugular vein was accordingly opened, and about eight ounces of blood taken away in a full stream. A most alarming degree of syncope immediately followed,

that threatened his instant dissolution. When the system had somewhat rallied from the sudden effect of this depletion, the pulse was found more slow and distinct; the symptoms of general distress had greatly abated; and the respiration was less hurried. The stupor, however, remained unabated. This comparatively quiescent state of the symptoms continued till the last; and it is more than probable that the fatal event, which happened about six hours afterwards, was not retarded by the venæsection, which, if employed more early and copiously, might have been perhaps more useful.

On examination of the head within eleven hours after death, the brain and its meninges exhibited the marks of previous inflammation, the vessels being found distended with blood, and about six ounces of water in the ventricles. The cranium was observed to be of unusual weight and thickness; the grooves on its internal surface, corresponding to the ramifications of the vessels of the dura mater, being very deep and tortuous.

It afterwards appeared from his father's information, that this young man had been long very subject to headaches, the predisposition to which complaints may have been partly influenced by the peculiar structure of the skull, which was remarkably small and heavy for so young a subject, the sutures being almost obliterated.

Intermittent fever.

It might be perhaps expected, from the low and humid site of Marlow, and its proximity to the muddy and flooded banks of the Thames, that intermittents would be frequent in the course of the river, and would have been more common at Marlow than was found to be the case; and it may have been owing perhaps to the College being situated on rather higher ground, at the distance of nearly half a mile from the river, that the institution did not suffer more from ague. Only four cases, however, occurred at Marlow, one of which succeeded to an attack of scarlatina*.

It is scarcely necessary to say any thing of the treatment pursued in this form of fever, except to remark that in one instance, which occurred in March 1811, during the hot stage of the disease, and which was attended with very high vascular excitement, the pulse being 140, the cold affusion was repeatedly tried with advantage, when it reduced the pulse to 110, and not only shortened the paroxysm, but evidently accelerated the cure of the disease.

Sandhurst.—Though, from the nature of the

* The writer is assured by a physician, who has for many years practised on the banks of the Thames, that idiopathic ague is a rare disease by the river side.

soil and face of the country, some spots of Bagshot Heath are marshy and probably insalubrious, yet the infrequency of intermitting fever among the members of the College, furnishes strong evidence of the healthiness of its local situation, at least of the absence of marsh miasma, only one case of this disease having occurred among the Cadets at Sandhurst in the course of four years. It was not the same with the troops who were employed upon the public works in clearing and draining grounds, and in the formation of roads, &c. and who lived in tents or rude huts, situated a few hundred yards in the rear of the College. The dampness of some spots occupied by these soldiers, especially in rainy seasons and in the winter, conspiring with the effects of their exposure to the vicissitudes of heat, cold, and moisture, as well as the imperfect shelter afforded by their tents or huts in bad weather, added to intemperate and irregular habits of living, may sufficiently account for the occurrence of intermittent fever among some men, and for the recurrence of it in others, who had been subject to the complaint while serving with the army in the peninsula of Europe; some of which cases were of long standing, and proved difficult of cure.

Cynanche Parotidæa.

This epidemic made its appearance in the College at Marlow in the end of February 1810, and

did not entirely disappear until the beginning of June. Fifty-six Cadets were affected in this time. In general, the feverishness was slight; but in some cases the fever was very high, and the glandular enlargement extensive: in one instance the tumefaction included the thyroid gland. In five subjects, metastasis took place to one or both testicles, accompanied with great excitement; but no subsequent affection of the head occurred in any case.

In the treatment calomel was freely used, in combination with other purgatives, both at the beginning and during the course of the disease, when the fever was considerable. These aperients, with the assistance of antimonial medicines and of topical bleedings, were the remedies principally employed. All the cases ended favourably.

Scarlatina.

In the beginning of February 1812, immediately upon the return of the members of the College after the Christmas recess, this disease manifested itself among the Cadets at Marlow; and after spreading considerable alarm, did not finally disappear till the month of May following. Notwithstanding the careful separation and seclusion of every infected case from the moment of its discovery until all probable risk of its propagating the infection seemed to have passed away; besides the

utmost attention paid to the purifying and ventilation, and even fumigating the rooms, and all the articles supposed to be infected; no less than thirty-five Cadets were attacked with this fever, of whom none died.

The throat was affected with ulceration or florid inflammation in almost every instance, and sometimes to a very alarming degree. In eighteen cases the fever was very considerable, and the tonsillar enlargement also very great. In one instance, the efflorescence on the skin did not finally disappear for more than a week.

In the treatment of scarlatina, as much as in that of continued fever, the utility of full catharsis, preceded by emetics, was most conspicuous, especially in the beginning. With this view, the submuriate of mercury was very generally employed, in combination with other aperients, in the energetic manner already described in the treatment of continued fever, and with similarly good effects. The rest of the treatment, also, was generally conducted in the same order and manner.

It may be proper to remark, that ptyalism was produced to a very great degree in one case of this disease; an effect which had not been observed to follow the use of mercury in any other febrile patient, although given to a greater extent. In

this instance, it must be acknowledged the consequent debility was truly alarming, and the convalescence was very slow. The total quantity of the submuriate taken was only eighteen grains; and it is right to observe, that this case of scarlatina was certainly one of the most violent and dangerous that occurred during the season*.

The external use of cold water, though employed with very little benefit in the continued fever of the Cadets, was found highly serviceable in scarlatina. The cold affusion, the shower-bath, the *lavatio frigida*, and *lavatio subtepidæ*, were severally and freely made use of in this contagion, under the necessary restrictions, with the most *perfect safety*, and with unequivocal advantage in the various conditions of very high or of moderately increased temperature of the skin; and scarcely in any instance did one or other of the above forms of employing the water fail to produce, more or less, abatement of fever, reduction

* The occasional supervention of such an unpleasant and very unwelcome consequence as severe ptyalism and great debility, arising in some very susceptible constitutions even from a moderate use of mercury, or a great and ill-founded dread of its deleterious effects, should never perhaps divert the medical attendant from the exercise of his judgment in the *due* employment of this active and useful medicine in dangerous maladies; although, in the course of his duty, he may have to contend sometimes against professional as well as vulgar prejudices, in the use of this as well as of other energetic remedies. The exciting of salivation, however, seems in any case an unnecessary object in the cure.

of the pulse, and a disposition towards moisture upon the skin, and to induce repose.

Blisters, sinapisms, or the *linimentum ammoniac*, were commonly applied to the throat, according to the existing circumstances of impeded deglutition, &c. and to the degree of counter-irritation which appeared to be required in that part; and the effects of these remedies, particularly of blisters, seemed to be highly serviceable in removing local tension and pain, and in assisting respiration and deglutition. With the same view, the use of large hot cataplasms, applied to the external fauces, sometimes over the blistered part, and often renewed, was found beneficial.

In some few instances, the tumefaction of the tonsils continued obstinate, under the use of powerful gargles, for a considerable time, producing more or less impediment in deglutition and articulation. For the relief of some of these affections, scarification of those glands was tried with good effect; in others, the size of the tumors resisted every means that were adopted for their reduction.

In one case, a violent attack of acute rheumatism succeeded to scarlatina, and was afterwards followed by anasarca of the legs and ancles;—a symptom which was not observed to ensue in any other instance. Was the general absence of anasarca after scarlatina, among the Cadets, to be

ascribed to the free employment of the cold affusion and shower-bath during the eruptive fever, to the liberal use of purgatives, or to both? The appearance of the ulcers in the throat of one patient was thought to warrant the exhibition of cinchona and wine; but none of the symptoms could be called malignant.

Variola.

Only one case of small-pox appeared in the College during the whole period of seven years; and this occurred in the month of August 1815, at Sandhurst. The patient had been vaccinated in India*, when an infant, and bore the inoculation mark in one arm. This very probably modified the present attack of variola. The eruptive fever was considerable; the pustules distinct, but began to crust on the sixth day from their first appearance. The progress of the disease was unaccompanied with danger.

It is to be observed, that previously to their reception into the institution, the Cadets may be considered as having almost always passed either through this disease, or the regular process of vaccination.

* After several failures, vaccination was happily established and propagated in India through the philanthropic exertions of the Medical Board at Bombay, in June 1802.

Epilepsia.

Seven cases of this disease became subjects of medical attention, most of which were not of a serious character, and required little other treatment than evacuations. The epileptic attacks appeared to be generally imputable to some temporary or accidental causes, probably to irregularities, and the patients stood in no need of long confinement.

The cold affusion was used with benefit in one case. This sufferer, who had had several fits in the course of the preceding twelve hours, was in the chilly evening of the 6th of November 1814, during a severe paroxysm, taken out of bed, and held upright in a vessel, while several successive pailsful of cold water were poured upon the head. The predisposition to the disease in this instance appeared to originate in the effect of some former injury done to the head (which was of an unusual form,) by the wheel of a carriage passing over it. On the 5th of November, the day before this attack, the patient had been scorched with gunpowder, while at play, in different parts of the body, and became epileptic while confined in the hospital with this accident, probably in consequence of the pain and irritation produced by those wounds. The effect of this remedy was a gradual and decided diminution of the convulsions, and a com-

parative return of sensibility after each affusion of water ; but the spasmodic affections, which had been sometimes so violent as to resemble some degree of emprosthotonos, continued more or less during the night, though only in the form of twitchings, attended with some delirium. He complained of great pain and a sensation of "stabbing in his chest." Eighteen ounces of blood were taken away from the arm the next morning, which produced a little syncope. A brisk cathartic, with eight grains of calomel, was next exhibited. The convulsive motions and unconsciousness, which had never entirely left him, now began to give way, so that in the course of a few hours he became quite sensible, and thenceforward continued to recover from the attack without suffering a relapse while he continued in the hospital*.

The utility of the cold affusion in the epileptic paroxysm was probably in this instance sufficiently apparent ; but as the disease here seemed to be strongly influenced by the presence of plethora and of local determination to the chest, the use of the lancet and of other counteracting means seemed to become absolutely necessary to the pro-

• This Cadet, on his way back to College after the summer vacation of 1815, was again attacked with the disease at an inn in Blackwater on the 2d of August, in consequence, as it seemed, of drinking spirits ; and was again relieved from the paroxysm by the cold affusion alone, administered as before, and he had no return of the disorder while he staid at the College.

duction of more permanent and essential benefit to the patient.

Convulsio.

Under this head it is intended to designate a case of disease arising from some affection of the brain, of an anomalous character from the commencement, of which the most important and dangerous feature appeared to be convulsion, proceeding from no evident cause, and terminating fatally, after a period of two months*.

The patient, anxiously expecting to return home at the beginning vacation in the middle of December 1813, was accidentally discovered to labour under impaired vision, which, together with some degree of strabismus, slight dilatation of the pupils, occasionally double vision, headach, and inability to see by candle-light, seemed to have been coming on some time before ; but his health, in other respects, not hindering him from the pursuit of his studies, he had not reported himself for these symptoms until the expected moment of his departure had almost arrived, when he had erroneously supposed, and cherished the disappointed hope, that he was to spend the recess with his

* The particulars of this case are selected and abridged from an accurate and circumstantial journal of the disease kept at the hospital; the writer himself having been at the time confined by long and serious illness.

friends, who intended it otherwise. He was sixteen years old, and tall for his age, being nearly six feet high,

On his admission into hospital on the 16th of December, the symptoms were nearly the same as above described, except that, although he had some slight pain in his eyes, he had then no actual headach. The pulse was natural. The bowels, it afterwards appeared from his own confession, had long been habitually constipated, which circumstance, however, he did not make known at this time. These were now repeatedly acted upon by submuriate of mercury and rhubarb, and blisters were applied behind the ears. The pain in his eyes, and occasional headachs were apparently relieved by the effects of these remedies. On the 28th of December, a blister was applied to the nucha, while he continued the use of the submuriate, generally in the dose of two grains, twice a day, sometimes combined with a like portion of antimonial powder, until the 31st of December 1813.

On the 25th and 26th of December, severally, epistaxis took place, which caused him, he said, "to see stronger," and the strabismus was less; but the last hæmorrhage appeared to weaken him much. No mercurial affection of the mouth was perceived on the 31st of December, nor any material alteration in the above symptoms.

At eleven o'clock in the evening of the 31st, he complained of headach, and very soon after was suddenly affected with distortion of the countenance, frothing at the mouth, stertorous breathing, and the usual comatose symptoms, which shortly ended in violent convulsions, attended with a rapid pulse. About eight or ten ounces of blood were immediately taken from the temporal artery, and some ammonia given to him by the mouth, soon after which he became somewhat sensible; the eyes remaining distorted, the pupils much dilated, and vision nearly gone. During the following two hours, he had one or two slighter attacks, the convulsions affecting only the head. The respiration and pulse had become calm, the latter, however, being hard. Since the attack, he had once vomited a yellowish fluid, and during the day, had had one scanty alvine motion. In the succeeding six hours he had many slight returns of convulsion of the face and foaming at the mouth, sometimes appearing to sleep, at other times being restless and seemingly in distress; and on being questioned, complaining of headach, but of no pain elsewhere. The following medicines were prescribed, and exhibited very regularly.

℞ Hydrargyri Submuriatis gr. ij,

Pulv. Jalapæ Compositi gr. xv, M., fiat Pulvis, quartâ quâque horâ sumendus.

℞ Liquoris Antimon. Tartarizat. ℥ij,

Misturæ Camphoratæ ℥vss, fiat Mistura, cujus sumat Cochlearia duo cum singulo pulvere.

The patient's head was also shaved, and cold applications assiduously made to it; a strong enema was injected; a blister was again applied to the nucha, and a sinapism to the feet. A solution of supertartrate of potash was ordered for drink.

During the ensuing twenty-four hours he frequently complained of his head, but had no convulsion; the pulse was rapid; pupils dilated, but contracting on the approach of light; the bowels were twice relieved.

The following night, exactly twenty-four hours from the last attack, he had another severe paroxysm of convulsions of the whole body; after which he experienced several slighter fits as before, affecting only the head, with great restlessness, the patient frequently throwing his hands about, and putting them to his head, moaning, and answering no questions; and during the fits, attempting to bite and pinch those about him, and speaking with great anger when moved; the pulse rapid and irregular.

January 2d. In addition to his medicines, which, as well as food, he swallows very readily, he took three grains of submuriate and half a drachm of compound powder of jalap. Three leeches were applied to the temples, and he was put into the warm bath, which last was followed by fainting in

about six minutes ; the respiration was slow, but not stertorous ; pulse 110, and small ; passes his excretions in bed ; appears partially sensible.

January 5th. His mother has arrived and visited him, but he takes no notice of her ; he however answers questions rationally, and can see objects. His bowels have been moved several times daily ; has not had a fit since last report ; the *pediluvium* is ordered at bedtime ; the powders and mixture are now directed to be given every six hours. This afternoon the temporal artery burst out and bled three or four ounces, and the bleeding was suppressed. He after that appeared more confused ; answered not ; and the pulse was weaker, but became stronger in the evening, beating 94 in the minute. The powders were continued, with the addition of a cathartic this night.

January 8th. In the afternoon of the 6th the temporal artery again bled about an ounce, and immediately he became convulsed ; the hæmorrhage in this case, probably, being only the effect of increased vascular action. The pulse was irregular as to strength and frequency, being generally from 90 to 100, and he appeared to be quite blind. Sometimes he has been rational, and conversing with his mother in French when any other person was in the room : at other times, his behaviour has been more like that of a maniac. The bowels having been rather torpid, ten grains of scammony

with two of camboge were added to each powder, and taken every six hours; besides an occasional saline aperient and a turpentine enema. The pulse being hard, twelve ounces of blood were taken to-day from the arm, which he bore well and derived relief from; the eye has been observed to be more or less red; another blister has been applied to the nucha.

January 11th. He is upon the whole better, and much more collected; the eye is less suffused; the breath has been for some days very foetid, and both tonsils appear ulcerated, (probably from the effects of mercury,) but there is no salivation. His bowels have been freely acted upon. He says his head is a little confused, and that "liquid fire seems to be running over his eyes." Pulse from 100 to 108; skin cool; tongue not much furred; complains much of hunger, and is exceedingly ravenous; countenance collapsed, and flesh emaciated. The following medicines were prescribed:

R Hydrarg. Submuriatis,
 Pulveris Antimonialis,
 Cambogiæ āā gr. iij,
 Digital. fol. Pulv. gr. j, M. fiat pulvis hora
 somni sumendus.

Eight leeches were applied to the temples, and one drachm of *Ung. Hydrargyri* directed to be rubbed in twice a day. Six drachms of cream of tartar were also ordered every morning.

January 16th. In addition to the above remedies, ten grains of *Pil. Hydrarg.* were given at bedtime since the 12th. For some days past he has slept a great deal; the strabismus is lessened; his vision is still indistinct, but rather improved; the ulceration of the throat is increased. Yesterday the temporal artery again burst out and bled eight ounces, and was now cut across: no delirium followed, nor was the pulse sensibly affected by it. The following medicines were given twice a day in room of all others: viz.

R Scammon.

Jalapæ, āā gr. x,

Hydrarg. Submuriatis, gr. j,

Cambogiæ, gr. iij,

Potassæ Supertart. 3j M. fiat pulvis.

January 22d. The bowels have been freely acted upon; he eats much nutriment; the throat has sloughed, and there has been some hæmorrhage from it at different times, the blood coming away chiefly in the form of coagula. He is now greatly debilitated and wasted; pulse 116, still full, and not easily compressible; tongue clean, except at the base; the wound after venæsection has suppurated, and the least scratch on any part of his body festers; the vesicated nucha having healed up, the blister was renewed to-day; the aperient powder last prescribed has been omitted.

January 30th. Since last report he has taken

some decoction of cinchona, with sulphuric acid and a very small portion of wine now and then, but never more than one ounce of the last in the day. The appearance of his throat has improved. It is scarcely necessary to state that powerful gargles were also assiduously employed. He says, "his appetite and health are as good as ever they were in his life, only that he is weak." He can now read large print. He owns, for the first time, that before his illness he had been constantly obstructed in the bowels. The wounds in his arm and temples, &c. have healed: pulse 110, and full.

February 6th. He has sat up repeatedly, and risen sometimes without assistance; the sight of the right eye is better than that of the left; his bowels have required various cathartics; he has been taking *Tinct. Digitalis* from fifteen to twenty-five drops every four or five hours since the 2d of February; pulse 90, softer; drowsiness; the digitalis to be continued.

February 10th. His sight is still very imperfect. On the 8th a seton was inserted in the left temple, and to-day another in the right. The first seton caused some loss of blood, and faintness followed. Pulse 90: the digitalis to be continued.

February 13th. Strength increasing; sight much the same; appetite insatiable; bowels torpid; pulse

90; setons beginning to discharge; no unfavourable symptom now discernible. He has been walking about his room, and sometimes groping out in the passage, guiding himself, and leaning with his hands on the bannisters for a week past, without help; and he is now expecting his mother to return, according to promise, and take him home. The digitalis is continued, with the supertartrate of potash.

February 14th. Was nauseated and restless last night; face rather swoln; scrotum oedematous; pulse 90, small; skin cool, and is scaly all over; no motion; tongue moist, and furred at the base: the digitalis is omitted, and a cathartic given.

About two o'clock this afternoon the muscles of the face were observed to be twitched, particularly about the eyes. He is perfectly rational, and sees as well as he did yesterday, but the eye-balls are occasionally drawn to the left; pupils not much dilated; face flushed and swoln, especially the left side of it; pulse 88, hard, full, and intermitting. Ten ounces of sily blood were taken away, which he bore well, and the pulse became softer. Having had only one motion, a strong enema was thrown up, containing aloes and mustard; and a dose of calomel and jalap given to him.

At four o'clock the twitchings were less; the enema had acted once; pulse full and irregular;

eyes glassy and prominent; he answers rationally; blood last drawn is cupped and firm; carotids beating violently. A blister is ordered to be applied to the head, and the purgative to be continued.

A little past seven, while in the act of taking his medicine, he was seized with violent universal convulsions, particularly of the face. Five or six ounces of blood were taken away, sinapisms applied to the feet, and the enema was repeated. All efforts, however, proved ineffectual; for at a quarter before eight the same evening, this long and very anxious case unfortunately terminated in death.

Dissection.

“On opening the head, the dura mater presented its natural appearance. The falx being turned back, the vessels, ramified on the surface of the brain, were seen extremely numerous, and very turgid with blood. On the anterior surface of the left hemisphere was an effusion of blood about the size of a shilling. On cutting into the brain, every part where vessels were seen ramified appeared preternaturally vascular. The ventricles contained about three or four drachms of fluid. The whole brain, particularly the tuber annulare, was very firm. Several small points, apparently purulent, were extremely numerous along the su-

perior part of each hemisphere, in the situation of the glandulæ pacchioni."

Chorea Sancti Viti.

One case of this disease was admitted on the 25th of December 1814, with irregular involuntary motions of the left upper extremity, a slight affection of the leg of that side, with a dragging of the right leg, and twitchings of the left corner of the mouth: the pulse was quick, but sometimes only 60 in the minute. He had also occasional hemi-crania on the left side.

Purgatives were tried with some but not very decided relief; they appeared to answer better when combined with tonic medicines, cordials, nutriment, and exercise in the open air. The patient, who was of a lax fibre, became gloomy and depressed while in hospital during the vacation, and gained but little ground. He was therefore suffered to attend his studies, and, together with exercise in the open air, he took the argentum nitratum in doses of only half a grain twice a day; under the use of which medicine his complaints entirely disappeared in the course of a few weeks. This was the only case of the disease that occurred.

A TABULAR VIEW

Of the Diseases of the Gentlemen Cadets admitted into Hospital at the Royal Military College, during a period of Eight Years, viz. from the 3rd of September 1809, to the 2d of September 1817.

DISEASES, &c.	AT MARLOW:		AT SANDHURST.		TOT. IN 8 YRS.			
	3 Years, viz. from 3d Sept. 1809, to 2d Sept. 1812.	Proportion of Sick to the Whole.	4 Years, viz. from 3d Sept. 1812, to 2d Sept. 1816.	Proportion of Sick to the Whole.	Admitted.	Discharged.	Removed.	Died.
Febris Intermittens...	4	1 in 150	1	1 in 925	5	5		
Continua.....	43	14	119	7½	195	191	2	2*
Mitior	101	5	169	5½	313	313		
Pneumonia.....	66	9	61	15	154	146	8	
Cynanche Tonsillaris	186	3½	188	5	393	393		
Trachealis	1	598			1	1		
Parotidæa	56	10½	14	66	70	70		
Ophthalmia.....	47	12½	43	21½	100	98	2	
Enteritis.....			1	925	1	1		
Hepatitis.....	1	598			1	1		
Nephritis.....	2	299			2	2		
Rheumatismus	67	9	30	31	101	99	2	
Odontalgia	13	46	14	66	28	28		
Otalgia	27	22	31	30	59	59		
Podagra	3	199	2	462	6	6		
Scarlatina.....	35	17			35	35		
Rubeola.....	13	46	2	462	15	15		
Variola.....			1	925	1	1		
Erysipelas	1	598			1	1		
Epistaxis.....	3	199	5	185	11	11		
Catarrhus	108	5½	130	7	311	310	1	
Hæmoptysis			1	925	1	1	1	
Hæmaturia			1	925	1	1		
Phthisis Incipiens....	4	150	1	925	5	2	3	
Syncope.....	5	120	10	92½	15	15		
Convulsio	1	598	2	462	3	2		1†
Chorea			1	925	1	1		
Epilepsia	4	150	5	185	9	9		
Palpitatio.....	1	598			1		1	
Dyspnœa	7	85			7	7		
Pertussis.....	2	299			2	2		
Colica	3	199	23	40	34	33	1	

* One case died at Marlow, 5th of June 1811: the other at Sandhurst, 31st of May 1816.

† This case died at Sandhurst, 14th of February 1814.

REFERENCES TO THE PLATES.

Plates I. and II. exhibit the appearance of the skin in the cases of Ichthyosis described by Mr. Martin, and referred to in pages 52 and 54.

Plates III. IV. and V. are illustrative of Mr. Howship's paper on Ossification, and are explained at page 177.

Plate VI. relates to the subject of Mr. Wardrop's paper on Nævi Materni, page 199.

Fig. 1. represents the external appearances of the tumor described in page 206.

Fig. 2. and 3. represent the internal structure of the Subcutaneous Nævus. In

Fig. 2. is seen another section of the same tumor as described in page 204, intended to represent a vessel so large as to admit a bougie.

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CASES
OF
FUNGUS HÆMATODES,
CANCER,
AND
TUBERCULATED SARCOMA,
WITH
OBSERVATIONS.

By GEORGE LANGSTAFF, Esq.

Read May 26, 1818.

THE first part of the Eighth Volume of the Transactions of this Society contains several of my cases of Fungus Hæmatodes, with observations. I there promised to describe some of the species and varieties of this disease, and to endeavour to trace the affinity it sometimes bears to carcinomatous affections; but fearing the paper would be considered too long, I reserved its completion until the present occasion, which I hope will not prove unacceptable.

Case of Fungus Hæmatodes in the lungs.

Mr. —, thirty years of age, of the middle stature and rather robust, of a fair complexion with red hair, by trade a cloth-presser, had been afflicted with cough and difficulty of breathing nearly two years, and had sought advice from some of the most eminent physicians in London.

By some, his complaint was considered asthma; by others, phthisis pulmonalis. During the last six months of his life, the cough and dyspnoea had become so distressing, and the expectoration so profuse, as to induce him, by the advice of his friends, to consult a physician distinguished for his knowledge of diseases of the lungs. By this gentleman he was pronounced to be in the last stage of consumption.

I only saw the patient the day previous to his death. He was labouring under the greatest difficulty in breathing I ever recollect witnessing; his countenance had a leaden hue, and his eyes appeared to protrude; his pulse was full, hard, and intermittent; and what he had expectorated, which was very profuse in quantity, looked like mucus mixed with a white fluid exactly similar to cream.

He was very hoarse, and complained of great pain in swallowing. With great difficulty he was

able to inform me of his having suffered for several months violent palpitation of the heart, accompanied with excessive pain in the right side of the chest, also under the clavicle, and along the under and inner part of the arm; that the least bodily or mental exertion increased the shortness of his breathing to such a degree as to threaten suffocation; and at those times he mostly experienced the sensation of fainting.

From this history of his case, and his not having had hectic fever, and being little emaciated, I did not consider the lungs in an ulcerated state; but there was little doubt of their being organically affected, and the symptoms strongly indicated a disordered or diseased condition of the heart, with some obstruction to the pulmonary circulation.

Dissection.

The heart was of an enormous magnitude, owing to the increased size of the left ventricle and thickness of its parietes, and would have been considered by Corvisart in an aneurismal state.

The auricles were greatly distended with very dark-coloured coagulated blood, but more particularly the left; and there was a considerable quantity of the same coloured blood in the left ventricle.

The pleura covering the lung and lining the chest on the right side, was thickly coated with organized coagulated lymph, and the adhesions between them were firm. The three lobes of the lung were converted into one firm elastic mass; but the upper anterior lobes formed at their root the chief bulk of the diseased structure, which adhered firmly to this side of the pericardium, the trachea and œsophagus being considerably compressed by the tumor. The right lung had degenerated into a white, moderately firm, pulpy, elastic substance, not unlike brain in appearance, which, when cut into, was found to contain a cream-coloured fluid exactly similar to that which had been expectorated. So much was the structure of the lung changed that it would scarcely have been recognized, had it not been for the small remains of cellular tissue, and the blue patches interspersed in the diseased production.

The disease had caused one side of the right bronchus to be absorbed, which allowed of its penetrating that part of the air tube, and had nearly closed it. The mucous lining of the trachea about an inch above where it divides into bronchi had a white shaggy appearance, and was loaded with cream-coloured fluid.

The pulpy mass was not possessed of high vascularity, which could not be expected, as the right

main branch of the pulmonary artery was so much compressed by the diseased growth as to render it almost useless, and the bronchial arteries could not be traced in the disease.

On the left side of the chest, the lung was distended with air to such an extent as to make it appear too large for its cavity. The arteries of the pleura pulmonalis were remarkably minute, numerous, and more beautifully displayed than I ever recollect noticing. There was not the least sign of inflammation, nor was there any appearance of disease in the substance of the lung; but the bronchial ramifications were loaded with fluid, similar to that which was seen in the lung on the right side, and the principal number of the bronchial glands were converted into a greyish pulpy substance, containing a thick white fluid; the other appeared to be enlarged, which was found to be occasioned by similar productions having been formed in their centres, whilst the glandular structure possessed its peculiar appearance.

Observations.

I have seen three more cases somewhat similar to the last described. The glandulæ bronchiales were changed into pulpy tumors, some as large as a swan's-egg pear, which pressed considerably upon the right and left division of the pulmonary artery; a large mass of the same structure occu-

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pying the angle made by the bifurcation of the trachea, and lessening the caliber of the bronchiæ.

In M. Bayle's excellently arranged work on pulmonary phthisis, some cases and dissections of this disease are given, under the denomination of cancerous phthisis.

I consider the case I have just described, and the two succeeding, also those related by M. Bayle, as species of Fungus Hæmatodes, or similar to what Mr. Abernethy has termed pulpy or medullary sarcoma.

Case of Fungus Hæmatodes affecting the liver, without the disease appearing in any other part of the body.

Ann Kendall, a pauper, fifty-six years of age, was placed under the care of Mr. Barnett, surgeon, St. John's Street, on the 20th of October 1816. The patient was apparently of a robust and full habit of body, and had enjoyed good health, although she had for a series of years accustomed herself to the abuse of spirituous liquors. She was suddenly attacked with violent bilious vomiting, attended with excruciating pain in the stomach and bowels, the latter being greatly relaxed.

The liver was found projecting considerably beyond its boundary ; and when pressed upon, pain was occasioned in it, and also in the right shoulder. Bleeding, blisters, effervescing medicines, mercury, opium, and an infinite variety of remedies were employed without subduing the violent irritability of the stomach, and the bowels remained in a relaxed state, the evacuations being mostly clay-coloured and free from fœtor. The pain in the liver and shoulder became more distressing ; there was also slight jaundice ; and as the stomach could not allow medicine in a solid or fluid state to remain in it a sufficient length of time to be of service, and nutriment being rejected, her powers sunk, and she died the eighth day from the attack.

Dissection.

There was not the least sign of peritoneal inflammation. The liver seemed to occupy nearly the whole abdomen ; it felt very firm, and its external appearance was of a dark green colour, with the exception of numerous whitish circular spots, immediately beneath its peritoneal covering. Those maculæ were various in size, the largest not exceeding an inch in diameter ; they had scarcely any projection ; the largest had central depressions, from the peritoneum having become cartilaginous, and there were a number of minute arteries supplying those diseased parts.

The gall-bladder did not contain much bile, it was extremely viscid, and nearly as black as pitch, but on dilution with water imparted a dark green colour.

The cystic duct, also the hepatic and common one, were completely plugged up with such morbid secretion as was found in the gall-bladder, and so considerable was the force required to urge it through these tubes in the direction it should pass to get into the intestine, that I was almost inclined to suppose that the inferior part of the ductus communis choledocus was obliterated.

With a view of better ascertaining the morbid structure of the liver, I injected it with subtile injection. Sections shewed that the principal bulk given to that viscus was by an addition of tumors, which pervaded pretty generally its substance and surfaces. That part of the liver not beset with tumors was of a very deep green colour, as if the pori biliarii had diffused their contents instead of conveying them to their main tubes; and so completely was the dye given, that nothing of the natural arrangement could be detected. The tumors were composed of pulpy white matter, from which an abundance of fluid similar to thick cream could be expressed; they were retained by reticulated cellular membrane and new formed coagulated lymph.

The tumors were not enveloped by capsules, but so intimately connected with the remaining structure of the liver, as to induce me to suppose, there must have been first interstitial absorption, to allow the vessels to take on the office of depositing these diseased masses. The liver was not much tinged with the coloured injection, except in the boundaries and substances of the tumors, which, with the green, gave a diversified appearance to the whole.

There were not any other signs of medullary tumors in or on the viscera of the abdomen. The spleen was enlarged, but not diseased; and the mucous coat of the stomach and intestines was loaded with blood, and appeared very red. The thoracic viscera were perfectly healthy.

Observations.

This is another proof of this disease affecting an important organ of the body without its being disseminated to other parts. And I think it will be admitted, that the diseased condition of the liver occasioned a morbid functional effect, which produced a nervous or sympathetic disorder of the other digestive viscera, and caused the death of the person.

In Mr. Wardrop's observations on Fungus Hæmatodes, he says, he never knew the liver to be

affected with *Fungus Hæmatodes* in any individual in whom the same disease had not first appeared in some other organ.

Case of Fungus Hæmatodes affecting the external part of the body, also most of the abdominal and thoracic viscera.

Master Fisher, who had from his birth evinced a more delicate constitution than is usual with children born and nurtured in the country, was observed to have a swelling the size of a small nutmeg, on the front of the forearm, about two inches above the wrist, with an inclination nearer the radius than the ulna. The boy at this period of the disease was only three years and a half old. In consequence of the gradual increase of the swelling, although there was not the least pain experienced, the child was placed under the care of my friend Mr. Snow, surgeon, Highgate.

The tumor was hard, and insensible to pressure. Means were employed to retard its progress, and for its dispersion, without effect, as it still continued to increase.

In the course of eighteen months from the commencement of the swelling, it attained only the size of a large orange; during its progress, very

little uneasiness was complained of, nor was the power of the flexor tendons materially interrupted or œdema occasioned.

Not the least inequality of the surface or substance of the tumor was discernible, nor had there been any increase of temperature or discolouration of the skin during the morbid growth, until about three weeks previous to the removal of the forearm ; when pain was complained of, the skin covering the swelling became rather hot, and shewed that dappled purplish hue, which is generally noticed in the latter stages of this disease.

There was not that degree of elasticity in the diseased part, which helps to give its specific character, until it had grown to a considerable size, and gradually attained a conical projection ; from this time the springiness increased, and a few days before amputation was decided upon, the fluctuating sensation appeared so decisive, as to induce Mr. Snow to make a small opening with a lancet. About half an ounce of thick dark-coloured blood escaped, the tumor retaining its elasticity.

A few hours after the opening was made into the tumor, a fungus protruded, which increased in a most surprising manner, from which there was a foetid bloody discharge.

The boy's health had not been materially affected

till this period. Mr. Astley Cooper saw the patient, and advised amputation of the fore-arm. The operation was performed by Mr. Snow on the 1st of May 1816, four days after the fungous protrusion, and about nineteen months from the first appearance of the morbid growth.

On dissection, the disease seemed to have its origin in the cellular tissue connecting the thecæ of the flexor tendons, and had made its way between those parts and the median nerve to the integuments, without occasioning the least disease in the former parts. The internal structure presented a firm, elastic, pulpy mass, mixed with coagulated blood; but the blood-vessels were small, and not numerous. The fungous substance had a sloughy fibrous appearance.

The stump healed tardily; the patient's health did not improve. About a month after the operation a small tumor was observed immediately above the left clavicle, about half an inch from its sternal extremity, partly covered by the clavicular portion of the musculus sterno-cleido-mastoideus. There was also a similar swelling in the left axilla. Those swellings felt and looked like indurated scrofulous absorbent glands. The tumors increased, and shewed the external character of the one which obliged the patient to submit to amputation.

Shortly after the appearance of the last described

enlargements, the patient's health became more affected, and he was teased with a frequent, dry, short cough, and dyspnœa.

The progressive stages of organic lesion of the lungs were evinced by the increase of distress in breathing; and the difficulty with which the pulmonary circulation was performed was denoted by the leaden colour of the lips and other features. None of the symptoms of hectic fever were present, nor was there that emaciation of the body, which we notice in tubercular phthisis.

The patient lived till the 9th of August 1816; nearly four months from the time the arm was amputated.

Dissection.

The tumor above the clavicle, and that in the axilla were examined first; the integuments covering them were neither discoloured nor diseased; each tumor had acquired the magnitude of a hen's egg; they possessed cellular capsules, and appeared to have their seat in that tissue.

A section of the morbid growths shewed a semi-cartilaginous structure, with a white pulpy substance, mixed with a small quantity of grumous blood; the absorbent glands in the axillæ, also

those concatenated in the neck, being perfectly healthy.

The stomach and intestines were greatly distended with air; and it was remarked that the stomach, spleen, and liver were depressed considerably lower into the abdominal cavity than is natural, by the contents of the chest having been pushed downwards, and the diaphragm yielding.

There was not the least sign of disease in the liver. The spleen was rather firm; not unlike liver; and there were three small white pulpy tumors, each about the size of a garden pea, near its right edge, immediately beneath the peritoneal covering.

The stomach and intestinal canal were healthy, except a few tumors exactly similar to those on the spleen, found beneath the serous coat of the ilium.

There was not any appearance of disease in the mesenteric glands, nor in the absorbent ones beneath the peritoneum; but there were two small tumors on the anterior surface of the right kidney, of the same character as those just described.

On removing the sternum, a quantity of bloody fluid flowed from the left side of the thorax. This side of the chest appeared filled (except the small

cavity produced by the fluid which escaped,) with broken down coagulated blood, and a pulpy mass, in consistence and appearance so exactly like the cerebrum, that I think an anatomist would have been deceived and led to imagine it to be brain, if he had been asked to give his opinion from the structure, without knowing the place in which it was formed.

This pulpy mass had accumulated in such an enormous quantity on the pleura pulmonalis, as to push the heart considerably beyond its usual situation into the right side of the chest, besides having, as I before mentioned, encroached on the abdominal cavity. A perpendicular section of the disease proved it to be principally formed of a congeries of various sized tumors, some as large as a small lemon, and all possessing delicate cysts. The consistence of those tumors was chiefly a brain-like mass, mixed with coagulated blood; but the largest kind were not unlike those described in the axilla and above the clavicle.

In the section the lung was recognized, but so much condensed by the surrounding disease, that it must have been completely useless in respiration, for a considerable time previous to the boy's death. This appearance also proved that the tumors had grown more from the surface, than the substance of the lung; and this opinion was corroborated by the state of the lung on the right side, the

tumors there occupying chiefly the surface beneath the pleura, many of which had by their growth occasioned absorption of that membrane, which allowed of their growing into the cavity of the chest, and would have produced, if the child could have lived much longer, a morbid growth like that on the left side.

Some of the tumors on the external part of the lung were as large as a walnut; there was also a progressive series of them, from the size of a pepper-corn to the magnitude above mentioned. They projected considerably from the lungs; their external appearance was delicately white, as if possessed of low vascularity; figure roundish, without any central depression; and each had its cyst. Their internal arrangement, more especially the larger kind, was a blended admixture of a semi-cartilaginous and pulpy matter, with small coagula of blood, but the smallest were exactly like the medullary part of the cerebrum; but none of them were divided by cellular septa or coagulated lymph.

Slight inflammation had existed on the pleura pulmonalis, as the three lobes of the lung were partly united by very delicate adhesions; but the pleura costalis had not been affected. The ramifications of the bronchial tube were loaded with a dirty looking mucus mixed with blood, unconnected with inflammation of the mucous lining.

The heart was perfectly healthy, as was the internal surface of the pericardium ; although its external part was loaded with the disease, and those portions of the phrenic nerves which pass over each side of it, were with difficulty dissected out.

I injected the right lung with size and vermilion, from the pulmonary artery, which made it and the capsules of the diseased growths red. The capsules were very vascular, particularly their internal surfaces ; but few vessels entered their contents, which led me to conclude, that the arteries supplying the capsules were the principal agents in secreting these heterogeneous substances.

Observations.

These capsules are not so vascular as those in which the matter is intersected by cellular septa, which might *a priori* be conceived, as this substance cannot be produced or supported without blood-vessels. I do not consider the matter secreted, which forms the various kinds of fungoid or scrophulous tumors, as possessing vitality ; that must only belong to the vessels which deposit such foreign matter.

In those instances where the tumors of this denomination are not covered with cysts, the parts on or in which they are seated are rendered consi-

derably more vascular than natural for the production of such secretions.

Case of Fungus Hæmatodes on the external part of the body, and in the lungs.

J. P——, a weaver, whilst shaking a bed, suddenly felt a severe pain, and, as he termed it, “a crack in the left side.” On examining the part about a quarter of an hour afterwards, he found a lump as big as a small tennis-ball at the part where he felt the sudden and acute pain, namely, about midway between the crista of the ilium and margin of the false ribs. There was no discoloration; the pain soon abated, but the tumor slowly increased in size, without occasioning pain. About three years from the commencement of the swelling, a surgeon saw the patient and handled the part very roughly, with a view of ascertaining its nature and internal limits. From this time the tumor was supposed to increase; the growth was unaccompanied with pain, and the patient’s health continued unimpaired. The tumor acquired almost an incredible magnitude; very large veins were seen ramifying on its external surface; the skin became discoloured, and the swelling conical; he now suffered severely from pain, and the integu-

ments began to ulcerate about the middle of August 1814.

His health began to suffer, and he was troubled with cough and dyspnœa; there was considerable hæmorrhage from the tumor, and a constant copious sanious discharge. The integuments and principal part of the convexity of the tumor sloughed; the discharge was immense, and from the extreme unpleasantness of the foetor, the poor fellow was in a most deplorable state. His powers gradually sunk, and he died at the latter end of October 1814, in the forty-sixth year of his age, and seven years from the first appearance of the swelling.

Dissection.

The tumor presented, to use the words of Mr. Pott, a strangely distempered mass. The external sloughy surface had a fibrous appearance; the internal structure was composed of masses of coagulated blood, firm, gelatinous, and medullary matter, and several distinct white tumors of a semi-cartilaginous density; the whole seeming to have had their seat in the adipose membrane.

There was not the least appearance of disease in any of the abdominal viscera. But the lungs were nearly filled with tumors, many as large as a small apple. Most of the tumors felt extremely

firm and elastic ; when cut into, some appeared composed of a substance not unlike blancmange ; others had more of the medullary character, and some were similar to the semicartilaginous parts of the external tumor, only not quite so firm. The capsules were rather thick, and many of the veins were plugged with pulpy matter.

Observations.

This case, the preceding, and the third related in my paper in the first part of the Eighth Volume of this Society's Transactions, I consider as varieties of Fungus Hæmatodes.

Mr. George Young occasionally saw the patient. To my friend Mr. Hodgson I was indebted for the opportunity of being present at the inspection, and the privilege of taking specimens of the diseased parts.

Case of Fungus Hæmatodes excited by Cancer Scroti.

William Lawrence, fifty years of age, a chimney-sweeper, was admitted into the sick ward of Cripplegate Workhouse, on the 25th of October 1815, with what has been denominated cancer scroti. The disease was on the right side of the scrotum, and had existed eight months. The

fungus was about an inch and a half in diameter, and had proceeded gradually from a small excrescence or wart. The integuments surrounding the diseased part were of a schirrous density, particularly the edges, which curled outwards; there was a considerable discharge of ichor, and frequently of blood. As the spermatic chord and inguinal glands were not contaminated, and his health had not been seriously impaired, I proposed extirpation of the diseased part as the only chance of saving his life, which he was anxious to have accomplished.

I performed the operation on the 5th of November, assisted by my friend Mr. Kingdon, surgeon. The disease having affected the tunica vaginalis, and from the testis not being considered of much importance to the patient, its removal was thought prudent, to prevent the possibility of the disease being communicated to that gland.

On inspecting the amputated parts, the tunica albuginea and testicle were found perfectly healthy, as also the spermatic chord.

A section of the tumor presented a medullary substance, with small portions or patches of coagulated blood, and orifices of minute blood-vessels. Although the density of the growth was considerably greater than that of brain, moderate

pressure with the fingers reduced it into a pulpy consistence.

The diseased integuments were schirrous, but without those ligamentous bands which are said to characterize carcinoma.

Although it was necessary to secure by ligatures four superficial arteries, beside the spermatic, the incised integuments nearly healed by the first intention. The patient's health and spirits improved daily, and I entertained considerable hope of his doing well, until the 20th of November, when he began to complain of great pain in the situation of the tuberosity of the ischium. Considerable swelling and induration were found in that part, extending to the perineum. The part was punctured, the swelling and pain daily increased, and he had frequent retention of urine, which was relieved by the introduction of a gum elastic catheter into the bladder. He had also great pain and difficulty in voiding his feces.

The integuments assumed a purple hue, and the tumor acquired that elastic feel, with a sense of fluctuation, which so strikingly characterize diseases of the fungoid tribe. On the 25th, the apex of the swollen part was very conical, and seemed merely covered by a

ticle. As the pain from the great distention was very distressing, I made an opening into the tumor, which gave outlet to a small quantity of thin bloody fluid, which moderated his sufferings. After this a fungus of a reddish and sloughy appearance protruded, bearing not the smallest resemblance to that removed from the scrotum. This growth increased, and the integuments were rapidly removed by the absorbents to give it egress; and there was considerable swelling and induration of the surrounding parts. The constitution now began to take the alarm; his health was affected; and on the 30th, the upper inguinal glands on both sides became diseased and enlarged rapidly; they were very painful, and felt elastic; the integuments were discoloured like those before described; the skin was gradually absorbed, and it was imagined the cuticle would be removed to allow protrusion of the projecting tumors.

The patient's health daily declined; the fungous growth increased in the perineum and bled freely; the swellings in the groins also enlarged, but did not completely destroy the restraining coverings; the retention of urine was relieved by the use of a catheter.

On the 6th of December, irritative fever commenced; the fungous growth sloughed, he sunk gradually, and death completed the business on the 11th of December 1815.

Dissection.

The diseased external parts were first examined. Most of the muscles arising from the ramus and tuberosity of the ischium, particularly the adductor longus and the gracilis, had become for a considerable distance so much altered by the intruding fungus, that their muscular fibres could scarcely be distinguished. The disease had also spread over the whole perineum, disorganizing the muscles. The tumor pressed firmly against the bulb and membranous part of the urethra, and had reached within the pelvis to the inner and upper part of the pubis, (on the left side,) having occasioned absorption of the periosteum and of the bone.

When the fungous mass was cut through, it was seen to consist of loose cellular substance, parts of which were in a sloughy state, coagulated lymph, minute blood-vessels, and a considerable quantity of fluid similar to thick cream, which fluid could be pressed out in abundance from the tumor. There were also several spiculæ of bone, which in all probability had been separated from the pubis and ischium.

The liver was very large, and contained a great number of various sized pulpy tubera, mixed with coagulated blood and a cream-like fluid.

Some of the tubercles were very small; the largest were near the surface of the liver, and none exceeded the magnitude of the common walnut. They all had delicate cysts, and the contained matter was retained by beautiful reticulated lymph. The large kind were formed by an aggregation of the smaller; they did not project far from the surface of the liver, but had a slight central depression, without the peritoneal covering being thickened; but the blood-vessels were very numerous in those parts, and most likely would (if the man had lived much longer) have occasioned that cartilaginous opacity mentioned in some of the former cases. The gall-bladder contained apparently healthy bile, which I have often noticed even in the greatest state of changes of structure. All the other viscera of the abdomen were free from disease, but the lumbar absorbent glands were changed into tumors exactly similar to those in the groins.

The bladder, although it contained a large quantity of thick foetid mucus, was perfectly healthy, with the exception of a polypous growth about the size of a cherry, with a long thickish pedicle, which had its origin from the mucous surface, immediately above the third lobe of the prostate.

The urethra was free from strictures, but the mucous surface of the membranous part was greatly

inflamed by the pressure and irritation occasioned by the disease in the perineum.

With the exception of old adhesions of the pleura, the thoracic contents were in a healthy condition.

Observations.

I have never seen a patient recover from chimney-sweepers' cancer, where extirpation of the diseased part was performed when the diseased action had affected the inguinal glands. In all those I have had an opportunity of seeing in hospital and private practice, the disease attacked the lumbar and abdominal glands; and frequently the viscera of the abdomen and thorax, occasioning hectic, sometimes irritative fever, terminating in death.

Case of Fungus Hæmatodes excited by a carcinomatous affection of the penis.

John Wall, aged fifty-one, who had led a very dissipated life, was admitted into St. Bartholomew's Hospital with a diseased state of the glans penis, accompanied with phymosis, which was on his admission supposed by Sir Charles Blicke to arise from a syphilitic sore. The man was put into the

ward for the reception of venereal patients, where he used mercury for a fortnight. This plan, instead of checking the diseased action, aggravated it, and brought on a violent inflammation and swelling of the penis. In consequence of this change, the patient was removed into a clean ward, and every attempt was made to subdue the inflammatory action, but in vain; for his health became seriously affected, and the end of the penis sloughed off. His health, after a considerable length of time, improved, but the sore could not be made to heal; the granulations were large, soft, and had a glossy appearance, from whence there issued a bloody, ichorous, foetid discharge, and the integuments surrounding the disease became extremely thick and hard, and he experienced great pain.

At this time the disease was considered cancerous; the inguinal glands on both sides became painful and enlarged; his health again declined, he left the hospital, and was admitted into the sick ward of Cripplegate Workhouse on the 26th of June 1813. There not being any probability of curing the disease, a plan of treatment was adopted merely to lessen the morbid sensibility of the nervous system, joined with a simple unirritating regimen.

The inguinal tumors increased slowly; they were very hard and painful; there was a very copious discharge of offensive ichor mixed with

blood from the diseased remains of the penis. Cataplasms of linseed meal and strong opiate lotion were applied to the swellings, and carrot poultice to the penis.

Conium, hyoscyamus, opium, and other sedatives were successively given in considerable doses gradually increased, which assisted to lessen his sufferings. The bowels were with difficulty kept regular, and the motions were mostly very dark coloured and extremely foetid, which made the occasional use of the blue pill necessary. From the stump of the penis there was frequent hæmorrhage; sometimes the granulations looked healthy, as if cicatrization was about to commence, but those appearances were only of short duration, and were succeeded by slow sloughing and absorption of parts, which, in the course of about four months, extended to a level with the pubes.

The patient's health became seriously affected; he was greatly emaciated, and looked extremely sallow; the tumors in the groins by this time had increased considerably; they occasioned distressing pain, felt firm and elastic, and the integuments were of a purplish colour, but not much increased in temperature.

On the 28th of October 1813, the integuments in the right groin began to slough, and there was a discharge of blood and ichor, which did

not occasion much reduction of the size of the swelling.

The ulcerative process likewise continued on the pubes. He was now in a deplorable condition, and his mind extremely wretched. A sloughy fungous growth shot out from the diseased parts where the integuments had been destroyed, from which there was a copious discharge of ichor frequently mixed with blood. The sloughing and ulcerative actions proceeded gradually on the pubes, and destroyed the whole of the skin of the groin, and a considerable portion belonging to the abdomen and thigh. So distinctly were the pulsations of the femoral artery seen, that it appeared naked; and although vessels thus situated do not frequently ulcerate, yet I fully anticipated hæmorrhage in this instance.

With a view of correcting the disagreeable foetor of the discharge, that he might be less noisome to himself and the other patients in the ward, carrot poultices, charcoal, and oxygenated muriatic acid were at different times employed. From the violence of the pain and burning heat he complained of in the sore, opium was obliged to be taken in large doses, two or three times a day, the other sedative remedies not having the desired effect, although given in very large quantities. The bowels were kept soluble with castor oil.

It is scarcely necessary to notice, that the poor creature's health almost daily declined; he was reduced to a mere shadow, and became extremely irritable. The fungous part separated and was discharged, which left a deep ragged looking ulcer, with thick, hard, irregular edges; and there was not the least attempt at reparation during the whole course of the disease, except on the penis, which I have noticed. Hectic fever, if I may be allowed the expression, of a slight kind, came on about the middle of December, which continued till the 12th of February 1814, when the irritative or typhoid commenced, which ended his misery on the 19th of the same month.

Dissection.

The chain of absorbent glands from the abdominal rings to the diaphragm, on both sides of the body, were greatly enlarged; some had acquired the size of a pigeon's egg; they felt soft and elastic; when cut into, their natural structure appeared to have been removed, and a pulpy greyish matter mixed with a thick white fluid supplied their place, which seemed to have been produced by the vessels of the capsules belonging to the original glands.

Many of the mesenteric glands had undergone a similar change; there were also several of those

tumors in and on the surface of the liver and in the lungs, but they were without capsules; those in the lungs presented appearances common to the early stages of the disease, consequently the specific excitement had not long existed in those viscera.

There was not any disease in the internal coat of the iliac or femoral artery; but the accompanying vein was filled completely from two inches below Poupart's ligament to the internal iliac, with a medullary matter similar to that occupying the place of the diseased absorbent glands, which adhered so closely to the inner surface as to lead to the supposition of its having been secreted there, particularly as there had not been ulceration from without inwards, to allow of such matter obliterating the vein.

The external disease, with the bones of the pubis, the bladder, and remaining organs of generation, were removed to be preserved.

Maceration shewed that the ulcerated parts were thickly coated with organized shaggy lymph; and the vasa vasorum belonging to the blood-vessels had poured out lymph abundantly to defend them from the ulcerative destruction, which I have repeatedly noticed where arteries have been insulated by surrounding disease, on the external part

of the body or in important viscera. This fact I have frequently remarked in the lungs of those patients who died with vomicae, and satisfactorily accounts for the infrequent occurrence of hæmorrhage in the last stage of phthisis.

The penis had been destroyed as far as its bulb; and the bladder, from having been rendered extremely irritable by the diseased condition of the urethra, and incapable of retaining much urine, was very small in size; its coats were greatly thickened, and the internal surface of the mucous one was slightly coated with coagulated lymph. There was not the least appearance of disease in the testes; but the right was drawn up very firmly to the abdominal ring, which had been occasioned by the ulceration having destroyed the inferior part of the fascia of the external oblique muscle, which exposed the internal oblique, and produced inflammation, retraction, and a thickened state of the cremaster muscle.

In the left groin the tumors had attained a considerable bulk, but the skin had not ulcerated. Their consistence was like the other morbid parts, with the addition of a greater proportion of coagulated blood.

*Case of carcinoma in the breast, with pulpy tumors
in the lungs, liver, and ovaries.*

Catherine Carter, a married woman who had never borne children, was admitted into the sick ward of Cripplegate Workhouse on the 17th of November 1814, in the forty-sixth year of her age.

The patient informed me of her having a diseased breast, which had troubled her above twelve months; and that she had been under the care of Mr. Astley Cooper in Guy's Hospital, which place she left in consequence of that gentleman's wishing her to submit to its removal.

It was the left breast that was affected, which was much larger than the right, and felt extremely hard and nodulated, but it was moveable on the pectoral muscle; the nipple had sunk, its edges were puckered, and there had been frequent oozing of blood through the lactiferous foramina.

As the poor woman's health was not seriously disordered, and there not being any sign of disease in the axillary glands, I considered amputation afforded the only probability of her recovery, which I strongly urged her to agree to; to this she could not make up her mind.

The menstrual periods had ceased about fourteen months previously to her coming into the workhouse. She complained of darting pains in the tumor, and of a burning heat and great degree of tenderness in the breast; her bowels were mostly costive.

Leeches were frequently applied, and poultices of linseed-meal and opiate lotion twice a day; the general state of her health was also attended to.

On the 16th of January 1815, she left the workhouse, and obtained admission into St. Thomas's Hospital, where she was placed under the care of Mr. Cline, Jun. Her breast ulcerated during her stay in the hospital, and she had frequent hæmorrhages from the part, which, with the pain and disturbed rest, reduced her state of health greatly. She was discharged incurable from this institution, and was re-admitted into Cripplegate Workhouse on the 29th of June, 1815. At this time there was a large deep chasm made in the breast by sloughing and ulceration; the edges of the ulcer were extremely hard, partly inverted and retorted; there was likewise a considerable ichorous discharge. The integuments surrounding the diseased part had a purplish appearance, and there were several tumors immediately beneath the cutis, which occasioned violent pain; and there was that peculiar leaden hue of countenance, and high

state of nervous irritability, which are noticed in carcinomatous and fungoid affections.

Carrot, turnip, and charcoal poultices were at different times employed, and opium was taken to mitigate her sufferings. There were occasionally fungous productions from the diseased parts, but their duration was short, as they sloughed, and their separation was mostly accompanied with considerable hæmorrhage, which continued with more or less violence for a week or ten days, then was succeeded by a profuse ichorous discharge which occasioned distressing pain. In this manner the disease committed devastation of the breast, without destroying in the same ratio the integumental parts ; so that there was a deep foul-looking excavation produced.

The glands in the axilla participated ; they became painful, enlarged slowly, and were remarkably hard ; and the arm became œdematous. A great number of small tumors appeared beneath the skin on both sides of the neck, also of the chest and abdomen, as if the sebaceous glands were diseased, the skin covering them having a bluish tint. In proportion to the apparent local mischief did the state of health decline. About seven months from her re-entering the workhouse, the virulence of the cancerous affection in the breast seemed to have (if such an expression is allowable) exhausted or worn itself out, as the

discharge rapidly lessened, the edges of the ulcer contracted, and lymph appeared to be formed by the vessels belonging to the pectoral muscle; and in this manner was a film or covering given to the ulcer*, which answered the purpose of one produced by granulations; but the edges of the ulcer and remaining parts of the breast were schirrous. After this unexpected change, the disease in the axillary glands began to be more active; the lungs became affected; a state of febrile affection, something similar to what is called hectic, was occasionally present; there was great dyspepsia, constant nausea with pain in the bowels, and diarrhoea, which carried the patient off on the 26th of April 1816.

Dissection.

The tumors scattered on various parts of the body, although they felt extremely hard, were of a firmish, red, pulpy consistence, and had cellular capsules.

The schirrous remains of the breast had formed close union with the pectoral muscle, and had

* In the way I have noticed in patients with sloughing phagedæna on the penis or in the groin; and a process something similar takes place occasionally on the exposed periosteum covering diseased bones, as in necrosis, where the action of the absorbents in removing the dead bone happens to be very slow.

occasioned a morbid thickening of that portion with which it was in contact.

A clean longitudinal section of those parts and the axillary glands, presented a very dense white substance with small patches of pulpy matter similar to the external tumors. There were a few irregular appearances of condensed cellular substance, such as we notice in any hardened part of the body, occasioned by disease not of the malignant class; but none of those firm whitish ligamentous bands, arranged in the way which authors who have described the genuine carcinomatous affection of the breast have discovered. Nor have I been so fortunate as to meet with a single specimen of this description, although I have examined a great number of carcinomatous breasts; which induces me to suppose, that the nature of carcinoma has become as much modified as the genuine chancre described by that very accurate observer Mr. Hunter.

In carcinoma of the stomach, where there has been considerable interstitial deposition between its coats, I have noticed that the cellular tissue has become thick, and its natural arrangement very obvious, and resembled in a slight degree those fibrous ramifications which are said to give character to cancer in the breast.

These ligamentous bands are very apparent in

the fleshy tubercles frequently met with beneath the peritoneal covering of the uterus, and in the substance and cavity of that organ; yet I believe they have never been found in an ulcerated state.

The lungs were free from adhesions, and there was not any appearance of inflammation of the pleuræ; but there was a thin white layer of stuff beneath the pleuræ pulmonales, not unlike recent mixed whitening or plaster of Paris with water, which appearance I have frequently met with on inspecting the lungs of cancerous patients.

The bronchial ramifications were greatly loaded with very white mucus; and there were a great number of tumors (none of which were larger than a marble) in the substance of the lungs, some pulpy of a brownish red colour, others of the medullary kind, but without cysts.

There were also several of those tumors between the layers of the omentum, and beneath the serous covering of the intestines; the liver seemed to have its principal bulk given by tumors of this description, only of a rather larger size, and the gall-bladder was filled with viscid black-coloured fluid.

There was not any appearance of disease in the substance or cavity of the uterus, except a greater

degree of rigidity of the os uteri than we generally find; but the ovaria were increased in size, their place having been occupied by a deposition of reddish pulpy matter similar to some of the before described tumors.

Observations.

The uterus is known to be subject to carcinomatous affections; it is also liable to a variety of diseases which have the common appellation of cancer. The cervix and cavity of the uterus are sometimes attacked with Fungus Hæmatodes, which disease is equally as unfavourable in its termination as the cancerous, and is mostly accompanied with the pulpy species of tumors in the abdominal viscera.

Case of carcinoma of the breast, with pulpy tumors in the lungs, liver, &c.

On the 20th of September 1816, Mary Caine, a poor Irishwoman, was brought into Cripplegate Workhouse. She had been in an indifferent state of health upwards of six months; she was greatly emaciated, and had a frequent, short cough, with a copious expectoration of very white mucus, accompanied with great dyspnœa: pulse 120, extremely small and weak. She complained of vio-

least pain and tenderness in the right breast, which had teased her upwards of three months. On examination I found the mamma, although very small, extremely hard, and immoveably adherent to the pectoral muscle; the skin covering the breast was closely studded with very hard, distinct tumors, none of which exceeded the size of a common garden black currant, and the integuments could not be pinched up. There was not any puckering of the nipple, nor were there at this time any other tumors observable. The fate of this poor creature being obviously decreed, it was not in my power to do more than to make her time here as comfortable as I could, by such remedies as tend to assuage bodily and perhaps mental pain.

The pulmonic affection gradually increased; the catamenia ceased; tumors similar to those on the breast appeared in vast numbers in the integuments of the neck, chest, and abdomen. She became extremely irritable and very sallow, as most patients do labouring under cancer.

About the 20th of February 1817, hectic fever commenced; the morning perspirations were profuse, and the discharge of mucus from the lungs considerable.

The axillary and inguinal glands enlarged; the bowels, which had during her illness generally been

disposed to be obstipated, became violently relaxed, and she died on the 24th of March, in the thirty-second year of her age.

Dissection.

None of the tumors on the external part of the body had acquired a bulk larger than a small marble, except those in the axillæ and groins, and they were each as big as a walnut. Although the skin covering most of them had a morbid bluish colour, yet there was not the least sign of beginning ulceration. Sections of those productions presented a brownish red-coloured structure, which was very compact; but when scraped with the edge of a knife, it looked like broken down liver and coagulated blood. The diseased breast seemed formed by an aggregation of those tumors, which had obtained considerable schirrhosity; but there were not any ligamentous bands observable, nor could any portion of the natural structure be detected.

There were a great number of various sized tumors, similar to those on the external part of the body, on the omentum, mesentery, and dispersed over the peritonæum and liver.

The uterus was healthy, but the ovaria were schirrhous, and when divided, appeared like the section of the diseased breast. Most of the ab-

sorbent glands in the groin, pelvis, and abdomen were enlarged, and had the internal appearance above described. The absorbent glands in the chest and neck were similarly affected, and there were a great number of tumors in the lungs, only larger than in any other part, some of which were in consistence like firm brain.

The other parts of the lungs were loaded with mucus, and there was slight inflammation.

Observations.

In this case I suppose the diseased state of the lungs produced such a great degree of constitutional irritation and debility, as to occasion the death of the patient before any of the tumors could get into such a state as to excite ulceration of their integuments. I have seen several cases similar to this, where the patients were destroyed by the disease in the liver or lungs making rapid progress, whilst that situated externally was kept in a "stunted or dwarfish state."

These observations, however, do not correspond with those given by Mr. Abernethy in his invaluable description of carcinomatous sarcoma. That gentleman says, "If the nervous and visceral disorders are active and considerable, the progress of the local disease will be, in general, proportionately rapid and destructive; and if, on the con-

trary, those disorders are mild and less in degree, the progress of the local disease will be proportionably slow and gentle."

From the similarity of morbid structure existing (as far as I have noticed) between this kind of carcinoma and the disease which has been termed by the above accurate pathologist tuberculated sarcoma, I feel disposed to take the liberty of supposing, that these diseases belong to one class, or have very great affinity, as I will endeavour to prove by the following case.

Case of Tuberculated Sarcoma.

A woman, fifty years of age, greatly emaciated, of a sallow complexion, and rendered extremely irritable by long disordered health, was admitted into St. Bartholomew's Hospital about the middle of August 1817.

She complained of pain in the abdomen, especially in the region of the liver, which was increased when moderate pressure was employed on examination.

There were a great number of various sized small hard tumors situated on the chest, abdomen, and thighs; and there was one about the size of

In the pancreas, which is a viscus seldom affected by disease of any kind, there were several of those tumors.

There were not any adhesions on either side of the chest ; the lungs were studded with small tumors, most of which were extremely hard, some rather soft, but all contained an inky fluid similar to what is generally seen in the bronchial glands.

The disease was disseminated on the inner surface of the pericardium as well as over its reflexion, and there were a great number of small tumors in the substance of the ventricles of the heart, on its auricles, likewise on some parts of the lining of its cavities. There were also some growing to the edge of the valve of the coronary vein, and many in the internal surface of the vein.

The spleen was the only viscus not affected with this disease.

Case of Tuberculated Sarcoma.

I lately examined the body of an unmarried woman who had tubercles similar to the last described, but they were more generally disseminated over the body, and the skin covering those situated on the breast and both sides of the neck had

ulcerated. The patient was forty years of age, had been ill eighteen months, and had a jaundiced appearance upwards of six months previous to her death.

Dissection.

The external tumors were so exactly like those last mentioned, that it is not necessary to say any thing more of them.

The mammæ, although possessing their natural rotundity, and without the least puckering of the nipples, were rendered extremely hard, and adhered firmly to the pectoral muscles. When divided, the healthy structure of the breast was seen to be changed into a cartilaginous substance, beset with innumerable various sized tumors, similar to those on the external part of the body; and the pectoral muscles had become hard and of a white colour.

There was a considerable quantity of yellow fluid in the abdomen. The liver was extremely large, very hard, and in colour not unlike white Castile soap, with clusters of yellow spots in it. When cut through, it was equally as hard as any schirrous tumor, and the reticulated arrangement of the cellular substance was very distinct in the condensed mass. The yellow spots seemed to be the common tuberculated state frequently seen in the

liver; and in all probability the whole of this viscus was in this condition previous to the cancerous action.

There were a great many tumors on various parts of the peritoneum, and a considerable number on the omentum; the largest did not exceed the size of a small strawberry: some of them when divided were as firm as the hard part of the breast or the liver; others were pulpy, and of a brownish red colour.

The spleen was nearly double the common size, although not diseased. There was not any change of structure in the uterus, but the ovaria were much enlarged and rendered schirrous.

The glands in the groins, those in the pelvis and lumbar regions, were very large and extremely solid. There were a number of small tumors in the lungs, containing a blackish fluid. The other parts appeared healthy.

Observations.

This is the only specimen of schirrous structure of the liver that I have met with.

Perhaps few of the cases I have related will be considered genuine specimens of *Fungus Hæmatodes*, from their not being attended with the

hæmatodal disposition; this I only consider as one of the effects of the disease: it was the morbid structure of the external tumors, with the corresponding appearances of lesion in the internal organs of the body, and the fatal results, that led me to class them in the way I have, for I know not where to place them better.

All ages are said to be liable to cancer; the same I believe may be said of Fungus Hæmatodes.

I have not had an opportunity of witnessing either of these diseases in more than one individual of the same family. Are they hereditary?

In the history of the preceding cases, I have endeavoured to shew that there exists a close resemblance in the morbid structure of Fungus Hæmatodes, pulpy or medullary sarcoma, tuberculated sarcoma, and carcinoma; or that those diseases may exist together in the same person, locally and constitutionally; or that fungous tumors may become cancerous, as Sir Everard Home supposes any kind of tumor may.

M. Bayle, in his work on Pulmonary Phthisis, says, "When I publish the result of my researches into cancerous complaints, I hope to shew that cancer is a primary disease of a peculiar nature, and

that though it is often met with united to other organic degeneracy, this coincidence proves nothing more than that these different degeneracies may occur in the same subject, and sometimes reciprocally influence one another, though one be not a transformation of the other."

So infinite are the varieties of these diseases in different subjects, and so seemingly alike in many instances in structure, that it is extremely difficult, nay almost impossible, to say how the series and modifications are produced.

From what I have seen of cancer and Fungus Hæmatodes, I am convinced of their not being local diseases, any more than those of the scrophulous class; they must therefore be considered what has been termed constitutional. And having noticed many small scrophulous tubercles in the lungs of still-born children; also pulpy tumors in the lungs of adult persons, who had not been affected during their lives with the least symptom of pulmonic disorder, and who died of active disease of a different description in other viscera; I am led to suppose that these specific and malignant diseases, such as cancer, Fungus Hæmatodes, and scrophula, have their origin perhaps with the formation or development of the natural parts of the fetus in utero; and that they remain, after the birth of the individual, in some instances dor-

mant or inactive for a series of years, and in all only require a peculiar morbid excitement to occasion their increase and destructiveness.

On this head I hope to gain more practical information; I therefore at present only mention the deductions I have drawn from the few facts I have seen, with a view of exciting the attention of those gentlemen who are engaged in pathological pursuits, that they may be induced to ascertain whether my conjectures respecting the origin of constitutional diseases are correct. With those ideas of the subject, and having often remarked a recurrence of the disease after patients had submitted to the removal of some member or part of their body; I shall in future carefully avoid inducing patients thus afflicted to consent to amputation of any important part, with the promised hope of preventing any re-appearance of the disease; as I know not any thing more distressing to the mind of a person who has suffered a painful operation, than to have its results unsuccessful; and I need not add, that it is a mortifying sight to the operator*.

* Scrophulous patients likewise frequently die of tubercular phthisis, after having suffered amputation of an arm or a leg; they are also liable afterwards to attacks of struma in the joints. For I have, on dissection, in those subjects found the bones forming the principal articulations much softer than natural, and a caseous deposition in the interstices of the cancelli.

Almost every part of the body seems to be liable to be attacked with *Fungus Hæmatodes*. I have preserved specimens of this disease in the brain, eye, heart, lungs, liver, spleen, kidneys, uterus, ovaries, intestines, bladder, omentum, veins, bones, and integuments; but I have never seen nerves, tendons, or cartilages thus affected. From the extensive connexion the cellular membrane has with nearly every part of the body, and this structure appearing the seat of the disease, I think I may venture to say, it is the part on which those morbid changes are deposited, or from which they are produced.

Generally speaking, I have found the genuine carcinomatous tumors slower in occasioning death, than the tuberculated sarcoma or fungoid diseases. The two former extend their malignant action to the adjacent absorbent glands; but in *Fungus Hæmatodes* those glands seldom take on the morbid alteration.

Man is not the only being obnoxious to *Fungus Hæmatodes*, as I have seen this disease with all its modifications in the external and internal parts of the body of monkeys, horses, oxen, sheep, pigs, dogs, cats, and birds. I have also remarked, that domesticated animals are more frequently the subjects of this affection than those in a state of nature; and that they are liable to most of the mor-

bid alterations of structure to which mankind are prone, with this difference, that they are capable of sustaining for a greater length of time pain and destruction of parts than the human being. Can this be accounted for from their want of a reasoning faculty?

Monkeys and pigs are very subject to scrofula. I have examined a great variety of the former, brought to this country, and they have generally died of scrofulous tumors, partly in the state of vomicae. I do not think that these abscesses are produced by the suppuration of tubercles, but by affection of the healthy surrounding structure, caused by the irritation of the tumors.

When scrofula attacks monkeys, it appears to be more generally diffused than in the human being, as I have repeatedly found the lungs, liver, spleen, kidneys, omentum, mesenteric and common absorbent glands, likewise several of the bones, greatly diseased.

The human liver is not frequently affected with the large kind of scrofulous tumors; monkeys afford remarkable specimens of them.

Sometimes the schirrous, medullary, and fungous structures are so blended in various parts of the same subject, that they appear like different stages of morbid growth; and the difficulty which

the pathologist experiences, is in deciding whether the disease is of the cancerous or hæmatodal kind, or whether they are not of the same class. Sir Everard Home, in his observations on the nature and progress of Cancer, says, so much does the same disease differ, in its appearances in different patients, from the endless peculiarities of their constitutions, by which every part of the body must be more or less influenced, that it is not possible, in practice, to distinguish in all cases between cancerous and scrofulous tumors, after they have advanced to a certain size ; he is ready to confess, that in many instances he has mistaken the one for the other, and has removed by operation tumors which at the time had the appearance of being cancerous, and upon examination, after their removal, found them of a scrofulous nature. On the other hand, he has neglected to remove tumors, from the circumstances making it probable that they were scrofulous, which afterwards became cancerous, and destroyed the patient.

There are several cases of medullary species of Fungus Hæmatodes in Sir Everard Home's book, described as cancerous, which have induced me to suppose, that this was the disease he had mistaken for the malignant scrofulous enlargement. But it is not mentioned whether the patients operated on for the supposed cancerous affection recovered, nor are the morbid appearances of the amputated parts described.

I have remarked, when cancerous tumors have been excised, and the disease had re-appeared, that the character of the tumors resembled the fungoid more than the primary ones. I have at present the occasional attendance on a patient similarly situated; a tumor of the cancerous kind was freely removed from her mamma about eighteen months ago, and she has now all the appearance of Fungus Hæmatodes in the same breast and in the axilla of the opposite side; her lungs are greatly affected, and her health is rapidly declining.

I shall not be considered singular in supposing there is some alliance between cancer and Fungus Hæmatodes, when I state that Sir Everard Home says, the fungated sore and the cancer are the effects of the same disease, only varying according to the structure of the parts which are attacked. The same author also says, the cases of Fungus Hæmatodes published by Mr. Hey were cases of true cancer, in parts of a muscular or other structure, which was disposed to produce an excrecent fungus. This gentleman afterwards acknowledges that Fungus Hæmatodes is by no means uncommon in our London hospitals.

From the number of cases I have related; and the acknowledgment of my possessing such a great variety of preparations of the fungoid class, it may be necessary to mention the opportunities I have, independent of private practice, of pursuing

pathological researches, lest it should be imagined that a greater number of these cases have come under my care, than fall to the share of most individual practitioners in London ; or that the disease has become more prevalent, since the time it was mentioned by that excellent surgeon Mr. Hey.

I have held the appointment of surgeon to the Workhouse of Cripplegate Without five years, which house generally contains upward of 270 paupers, many of whom are admitted with the worst species of disease, besides having suffered, previous to their admission, all the privations which abject poverty occasions ; and many of them discharged incurable from hospitals. I likewise, through the beneficence of the parishioners, receive orders from the churchwardens, to afford relief to upwards of 300 out-door patients annually.

Since my appointment to this institution, regular sick wards have been established, and every comfort afforded to the patients.

I cannot conclude this paper without expressing my great respect for those gentlemen who conduct the affairs of this parish, for the readiness they have uniformly evinced in allowing me to inspect such deceased bodies as I have had reason to suppose would upon examination be productive of practical utility.

Hitherto I have only related cases which did not admit of cure, and appear *opprobria* to physic and surgery ; but I purpose giving such as shew the happy curative means we possess, and the advantages derived from pathological anatomy.

CASE
OF
HYDROCEPHALUS,

**SUCCESSFULLY TREATED BY THE REMOVAL OF THE
WATER BY OPERATION.**

By JAMES VOSE, M.D.

OF LIVERPOOL.

Read May 26, 1818.

ON the 11th of July last I was requested by Dr. Formby, my friend and colleague at the Liverpool General Dispensary, to see a case of advanced Hydrocephalus with him. The patient was an infant of seven weeks old, whose head was enlarged by the accumulated fluid to between two and three times its natural size. But little ossification seemed to have taken place since the birth of the child, shortly after which the mother noticed the preternatural and increasing size of the head. The enlargement had been progressive from that time, and the head had become so transparent, that when held between the eye and the light, it was not unaptly compared to a paper lantern.

The child, at the time I visited it with Dr. Formby, being free from any additional symptoms indicating a serious affection of the general health, with the exception of a slight derangement of the bowels and occasional convulsions, we thought this a favourable case for the experiment of gradually discharging the water from the head by puncture. The operation was accordingly performed the next day by means of a couching needle of the size and shape formerly in use. Three ounces and five drachms of limpid fluid were discharged, and the opening was closed with adhesive plaster, a roller being at the same time applied round the head. After the discharge of this small quantity of water, the head lost its tension and globular form, and became so flaccid as to allow the water to gravitate backwards while the child was laid upon its mother's knee, giving to the loose integuments the form of a pendulous bag. About an equal quantity of water dribbled from the orifice after the operation, and the child sunk so extremely low as to create the greatest alarm in the mind of the mother, and induce her to apply to the Dispensary for assistance at midnight. The child, however, revived without the aid of medicine, and the water again accumulating, the head became as tense as before in a very few days. On the 29th of July the operation was repeated. I was less cautious in the mode of the puncture and the quantity of fluid abstracted on this occasion: the operation was performed with the curved and

pointed bistouri of my pocket case, and five ounces of fluid were evacuated.

No unpleasant consequences followed, and the head having regained its former size, it was a third time punctured on the 20th of August. Eight ounces of the contained fluid were now discharged, and no constitutional disturbance succeeded to the operation.

The head was punctured for the last time on the 29th of August, and a small grooved director being introduced into the orifice, twelve ounces of the fluid were drawn in a continued stream.

The head on this occasion became so flaccid and shapeless, that the mother was shocked at its appearance, and fearful of the consequences of raising the child from her knee. No derangement of the health followed this fourth operation.

It was observed that between the first and second operation, the relaxed state of the integuments had allowed the process of ossification to advance in a perceptible degree. This was still more remarkable after each of the succeeding operations; and before the last, the sagittal suture, which had at the commencement of the treatment divided the frontal bone as low as the nose by a wide chasm, was entirely obliterated at this part, by the union of the two opposite portions of the bone.

A short time after the last operation, the child was perceived to discharge a considerable quantity of water by the bowels ;—this at first took place with the natural motions, but afterwards the water, resembling in its sensible qualities that discharged from the head, was evacuated alone, and continued to be so for four or five days. The same low state as followed the first puncture of the head, took place on the second day of this discharge from the bowels, and it was particularly remarked, that a diminution of the size of the head had corresponded with the quantity of water thus evacuated. Ossification now advanced with greater rapidity, and the bones of the head are at present nearly as complete as is usual in a healthy child of similar age. Our little patient has besides improved in health, size, and vigour; its appetite and digestion are good; and what has afforded us particular interest, not a single convulsion has occurred since the first operation.

My friend Dr. Traill, who unites to very various scientific acquirements much skill in practical chemistry, examined the water discharged from the head at each operation, and found it at first to contain scarcely any trace of albumen; he considered it to possess more of the characters of simply diluted mucus. After the second and third operations, the presence of albumen was more sensible.

358 DR. VOSE'S CASE OF HYDROCEPHALUS.

The medical treatment of the child was restricted to the preservation of the action of the bowels by small doses of hydrarg. cum creta.

Liverpool, Nov. 27, 1817.

ACCOUNT OF A CASE
OF
DEFECTIVE POWER
TO
DISTINGUISH COLOURS.

By WHITLOCK NICHOLL, M.D. F.L.S.
OF LUDLOW.

Read May 26, 1818.

THE Medical and Chirurgical Society having honoured a case of imperfect vision, which I formerly sent, with a place in its Transactions, I am induced to transmit the account of a similar case which has more recently come within my knowledge. Although it bears a close resemblance to the former, I nevertheless am tempted to present it, since it may be well as a matter of curiosity that cases of this anomalous nature should be collected and compared with each other with a view to the explanation of the cause of the imperfection.

I give the case in the words of the gentleman who is the subject of it, and who lives near Mauchlin in Ayrshire.

“ My eyes are of the same colour with the youth’s you mention*, grey, with a yellow tinge round the pupil; the pupil is rather small but not remarkably so. The colour I am most at a loss with is green, and in attempting to distinguish it from red it is nearly guess-work. Scarlet in most cases I can distinguish, but a dark bottle-green I could not, with any certainty, from brown. Light yellow I know; dark yellow I might confound with light brown, though in most cases I think I should know them from red.

“ The different shades of red and green I know not to which they belong; but when they are before me, I see a difference in the shade. All the shades of light red, pink, purple, &c. I call light blue. But dark blues and black I think I know with certainty. Though I see different shades in looking at a rainbow, I should say it was a mixture of yellow and blue, yellow in the center and blue towards the edges. I have red crimson curtains on the window of my bed-room, which appear to me red in candle-light, and blue in day-light. What is called invisible green is not so to me, it is too dark, but if railings were painted red, I could not distinguish them from the grass.

“ The grass in full verdure appears to me what other people call red, and the fruit on trees when

* Referring to the case published in the Med. Chir. Transact. Vol. VII.

red, I cannot distinguish from the leaves, unless when I am near it, and then more from the difference of shape than colour. A cucumber and a lobster (boiled) I should call the same colour, making allowance for the variety of shade to be found in both, and a leek in luxuriance of growth is to me more like a stick of red sealing-wax than any thing I can compare it with.

“ The only advantage I have observed from this peculiar vision is, that I see objects at a greater distance and more distinctly in the dark than any one I recollect to have met with ; this I discovered many years before I was aware of my defective vision in colours. I am in the 49th year of my age, and I do not find my sight getting dim as it generally does in persons before that time of life.

“ I am the youngest of a family of ten children, nine of whom arrived at maturity. I had a brother who died in 1791, and who I since find could not distinguish colours ; I can now only say that this defect in him was known, but nothing farther that I can communicate with certainty ; with this exception, I am the only one in whom this defect was discovered, nor have I heard of its existence in any of my ancestors. I have four nephews and four nieces, and I think the last time I saw my only surviving brother, he told me a similar defect had been observed in his youngest daughter, a girl about 12 years of age. My own family consists of

three sons and two daughters: the eldest a boy of 17, the youngest a girl about three years old. A boy and a girl have dark eyes like their mother, the other three have eyes something like mine, but there is no yellow tinge round the pupil, and it is larger than in mine; in none of them as yet has any defect of vision been discovered; they frequently amuse themselves by bringing me bits of cloth of various colours, and ask me, 'What colour is this?' When I pronounce my opinion, it generally creates a burst of laughter in the group, a proof that it appears very different to them.

"Capt. W. a neighbour of mine, I understand, has a similar defect, and also several of his relations, but I am sorry to say that he declines writing on his case."

Such is the statement which this intelligent gentleman favoured me with. In replying to it, I enclosed a circular spot of red upon a white ground, the diameter of the circle being about an inch and a half, and on the opposite sheet a similar spot painted green. I requested him to look steadily at the red spot by a strong candle-light until the eye was fatigued, when, withdrawing the spectrum, he was, with his eyes half-closed, still partially to admit into them the rays from the candle, and to remark whether any spot then appeared, and of what colour. He was afterwards to make the same experiment with the green spot. I, of course, need

not remind you that in these well-known experiments, the eye after being fatigued with dwelling on the red spot, has the appearance of a green spot presented to it and *vice versa*. His statement of his trial of these experiments is as follows :

“ In looking at the spots you sent me by a strong light of a candle, then removing the paper, and partly shutting my eyes in the way you describe, I see no spot of any kind round the candle. My eyes do not dazzle or become dim in looking at the spot for half an hour at a time, but they get very painful and do not recover till I have slept a night. I have shewn your letter to many of my acquaintance, and the result has been almost invariably as you describe, namely after looking at the red spot for a minute or two, then removing the paper, and nearly closing the eye or eyes, they see a green spot where the red was before, and the reverse when they have looked at the green one.”

Ludlow, April 26, 1818.

ON THE USE
OF THE
ACTUAL CAUTERY
AS A
REMEDY FOR THE CURE OF DISEASES.

By J. P. MAUNOIR,

PROFESSOR OF SURGERY IN THE UNIVERSITY OF GENEVA,

Read June 9, 1818.

THE application of fire to the human body, was looked upon by the ancients as a powerful remedy in a numerous class of diseases; while in the present day it is so totally disused in England, that the proposal to employ it would excite not merely astonishment but alarm. The labours of Pouteau, Percy, Larrey, who have written so fully on this subject, have been in vain: even were their works to reach this country, they would be received with distrust, and read by a few surgeons only. But none would take upon himself to become the advocate of Cautery, either in theory or practice, however he may regret its having fallen into dis-

use in modern surgery. The chief reasons for its having been abandoned in England, appear to be, in the first place, the abuse made of fire in the treatment of local gout; and in the second, the anathema fulminated against it by the celebrated Sharp.

In the treatment of local gout, the parts affected were relieved, and to all appearance cured, by the action of fire; but in a short time afterwards, the stomach, the lungs, or some other organic part of vital importance, became the seat of a disease resembling the gout, which usually proved fatal.

With respect to the influence which Mr. Sharp had in abolishing Caution, he was a man so justly looked up to as an oracle by his pupils and cotemporaries, that every thing he wrote or said was alike received by them as having the stamp of infallibility; and all inquiry into the justice of his condemnations was deemed unnecessary. He had no doubt witnessed an imprudent employment or abuse of the Actual Caution, and instead of publishing the nature of the cases, in which he considered it attended with danger, he proscribed the practice altogether. The following are his words: "When scarification and the other remedies fail, it has been operative in all ages, from the time of Hippocrates down to the beginning of this century, to cauterize the eschar; the memorable apho-

rism* he left behind him relative to the officinary of fire, brought the Cautery into use upon almost every occasion. In mortifications, they believed that the putrefying principle or venom was extracted with the juices that were dried up by the hot iron. They thought likewise that the separation of the sloughs was exceedingly assisted by this process; and what was more important, they imagined that the life of the part was quickened, by drawing the spirits to it, and freeing it of all humidities.

“ I have here used the language of all writers upon this subject, and we have hardly in surgery a more extraordinary instance of human fallibility than this; for after an uninterrupted practice of above two thousand years, this celebrated remedy, whose virtues were supposed to be eminent both from reason and experience, is at length fallen into disrepute, and never employed for stopping a gangrene.

“ It has also met with the same fate in regard to many other distempers for which it was formerly deemed a kind of specific; but it has lost its ground gradually. When it was abolished from

* Quæ medicamentis non sanantur, ferro sanantur; quæ ferro non sanantur, igne sanantur; quæ igne non sanantur, illa existimare oportet insanabilia.

among the remedies for gangrene, it was still reserved for cancerous tumors and excrescences, from a persuasion that it would kill any lurking venom near the cancer. And now that it is no longer used for this disorder, it continues to be practised upon carious bones, in order to promote exfoliation; but I think upon no better ground than in the other case. So that in all probability, it will by and bye be universally discarded even for the exfoliation of bones. In England it is already done; but for the final removal of these prejudices we must allow time."

He says elsewhere: "However, if it be only uncertain whether the Actual Cautery is beneficial or no, the cruelty that attends the use of it should entirely banish it out of practice."

While Sharp was condemning Actual Cautery in London, Dionis was doing the same in Paris. In shewing his auditors the various forms of cauterizing irons used by the ancients, he said, "I know no person who dares employ them now, and I only shew them to inspire you with more horror of their use."

It is remarkable, that in the Philosophical Transactions, destined to be a lasting monument to posterity of the progress of mankind in scientific knowledge, there should not be one single observation on the Actual Cautery.

Mr. Cooper, in his Surgical Dictionary, has followed the example of Sharp. He so positively condemns the use of fire as not even to have mentioned it in the article on the bite of a mad dog.

The inference intended to be conveyed is, that the use of fire in surgery was the consequence of a false theory, founded on a barbarous prejudice ; that its application was not only useless but cruel, and attended with danger. But when we consider that this prejudice lasted two thousand years ; that it exists still in the greatest part of the world ; that the famous Hippocrates has extolled fire as one of the most efficacious remedies ; that after him, Celsus, Albucasis, Marcus Aurelius Severinus, Ambroise Parry, &c. have spoken of it as a truly useful means in surgery ; we must feel a wish to take a retrospective view of its merits, and endeavour to ascertain to what causes may be attributed the veneration in which it was held by the ancients, and for what reasons the use of fire had grown obsolete for so long a series of years on the continent, and why it continues to this day to be so in Great Britain.

We cannot doubt but that the admiration in which the practice was held was founded on its success. We can have little doubt either, that the progress made in surgery has caused it to be rejected in cases where it was improperly used,

and for which simpler means have been employed, and simpler operations substituted. The limits of this memoir will not admit even of a cursory view of the various ways of employing Cautery, of the different diseases that have been treated by fire, or of the circumstances where its application would be proper, or where it would be reprehensible : my aim is only to prove that Sharp and Dionis went such lengths in their proscription of fire, that in aiming at the destruction of a prejudice, they have established one of an opposite nature—“*in vitium ducit culpæ fuga*.” Any one who has overcome this prejudice, and is desirous of further particulars, may satisfy his curiosity by looking into Mr. Percy's *Pyrotechnia Chirurgicale*, which appears to me to be a classical work eminently useful and even indispensable, and which is still among the desiderata in English surgery. A translation of it would be the signal in this country to light up anew on the altar of the god of medicine, that sacred fire which has been so long extinguished.

I shall now merely offer to your notice a few cases where, when every other remedy had failed, I have tried the effects of Cautery with the fullest success.

In 1798, a young Savoyard, tall, well made, and healthy in other respects, had been for many years afflicted with local scrofula. A hard, red

string of glands suppurating in seven or eight places, extended along the lower jaw and upper part of the throat from ear to ear, or from one mastoid process and parotid gland to that on the other side. The disease had been taken in its infancy, and many remedies tried to no effect. I advised artificial sea-baths, washing with cold water, nitrate of silver, mercurial ointments, &c. gave interiorly bark, iron, muriate of lime, and prescribed exercise and a strengthening diet: the disease did not augment, but yet was stationary. When one fistula closed, another opened near it. The patient was equally persevering with myself in giving to each remedy a fair trial. Fatigued at last by their inutility, I proposed trying the effect of Actual Caутery, to which he immediately assented.

I then burnt with a cauterizing iron, heated to the greatest degree, the fistulas and ulcerated glands. The difference in their appearance, after the sloughs had fallen, was astonishing. A complete cicatrization of a part of the ulcers followed shortly after; others resisted this first application, and resumed their bad appearance: a second application of fire determined their cure. The enlargement of the glands totally disappeared about six months after the cicatrization of the ulcers.

About the same time I attended a countryman of Vallorbe, a village situated on the Jura in the

Canton de Vaux. He was from twenty-five to twenty-eight years old. For eighteen months past his left thigh had been dissected by a number of fistulæ, in consequence of abscesses by congestion that had been opened and treated in the most ordinary manner. These sinuous ulcers were situated between the muscles and the skin: some of them extended to a great length between two muscles. I shall pass over the history of their treatment, with sulphureous baths, incisions, stimulant injections, &c. Suffice it to say, that fire succeeded when every other remedy had failed. In consequence of the frequent application of the olive-shaped Cautery, not only the fistulæ were cicatrized, but the thigh and leg so far recovered their strength as to be nearly on a par with the other limb.

Pouteau has frequently observed, that at the very instant the moxa was applied, the weakened parts of the body seemed to become invigorated.

One of the motives for rejecting Cautery is an idea of its being painful to excess. Were this supposition well founded, ought we even then to renounce it when no other remedy afforded relief? But if not totally unfounded, it is at least much exaggerated, as the following narrative will evince.

Some years ago, a lad named Tulou, when without his coat, was bitten in the hand and arm by a

mad dog : he had eight or ten wounds. I assured his parents that burning was the only means of saving his life. The boy positively refused to submit, declaring that he had rather run the risk of dying, than undergo so cruel an operation. Having full authority from the father and mother, I sent for four men who tied the rebellious boy to a chair in spite of his cries, and held his hand and arm extended. He still continued to scream aloud, and made the utmost efforts to elude the operation ; but he had no sooner felt the burning iron on one of the wounds, than he stopped, and said quickly, " Is that all? untie me, and set me free, I will not move;" and bore, in fact, with perfect serenity, the repeated application of Actual Cautery, desiring me when I had finished, to examine carefully if no scratch remained. It is scarcely necessary to say, that this young man had not the least symptom of hydrophobia afterwards. Indeed, I never had any unfortunate case from the bite of a mad dog, though I have attended a considerable number of persons bitten, and constantly employed burning irons heated to such a degree, as to produce by their application, immediate slough over the whole of that part where the tooth of the animal had reached.

Mr. Baillif, aged fifty years, employed in the salt-petre mines, had, I know not how long before I attended him, the whole of the membrane lining

the cheeks in a state of chronic enlargement. The teeth of the upper and lower jaw were buried in the gums. The roof of the mouth was nearly on a level with the upper edge of the teeth. This enlargement extended itself to the pharynx exclusively. Mastication and deglutition were alike difficult and painful. This swelling was neither of a soft nor bleeding kind; it partook of the nature of a scirrhous tumor, rather than that produced by a fungus or scorbutic disposition. The patient had gone through a course of remedies at Lyons, and been attended several months at Geneva by Dr. Peschier, who brought him to me in 1813. My proposal of employing Actual Cautery, was accepted without hesitation, and the operation performed at three different times, at the distance of a fortnight, in the following manner*.

I drew the red hot iron rapidly over the gums, so as to produce instantaneously a deep rut, wherever they had passed. Each operation required the application of the iron at least twenty different times. For which purpose half a dozen olive-irons, about the size of a tonquin bean, were ready at the same instant, that they might never be used but with the greatest degree of heat. The patient continued so tranquil under the operation, that a stander-by must have concluded it was scarcely

* The carious teeth and roots were drawn two or three weeks before the operation, without effecting the least change in the disease.

painful. The usual falling off of the sloughs, and the abundant suppuration which followed, terminated in a complete cure of the disease.

Mr. P., an English gentleman, formerly a surgeon, had for the last fifteen years an ulcer on the lower lip, which I shall not hazard to call cancerous, but which had a very alarming appearance, with hard and elevated edges. He had been attended during several years in London by surgeons of the highest merit. The ulcer had sometimes appeared to be getting better, but had never entirely healed. When I first saw Mr. P. it extended about half an inch in height, and a full inch across the red part of the lip, the tissue did not appear to be altered beyond the ulcer, and the lip preserved its natural suppleness. In spite of the long standing of this disease, and the profound grief it occasioned to the patient, his constitution appeared in other respects perfectly sound, from which I concluded it to be a local and not a constitutional disease.

After consulting with my brother, we agreed to try Actual Cautery, to which Mr. P. willingly assented, in spite of the prejudice of his countrymen against it. The ulcer was then deeply cauterized, and gave infinitely less pain to the patient than he expected. He readily assented, twelve days after,

to have the operation renewed, on a part of the wound that was still rather hard and elevated. A deep slough succeeded the hard swelling, and the patient was cured, in the space of three weeks, of a disease that had resisted fifteen years' treatment of the best administered and well known remedies. The lip which till then was in a constant state of swelling, has now recovered its form and natural appearance. I judged it proper to establish an issue, that the constitution might not be impaired by the stoppage of a flowing, which, from having lasted so many years, had become natural to it.

Mr. M. D. returned to Geneva at the age of 45, having spent the best part of his life in Russia in every kind of dissipation. He was tormented with rheumatism that manifested itself with violence in the lumbar region. The pains obliged the patient to keep his bed. The spinal bone began to bend, and formed an elevation at the lumbar region near the sacrum. His legs grew weaker from day to day, and at last became totally useless. Every kind of internal remedy was employed. I attended him for two years in conjunction with Doctors Vieussieux and Peschier. Nothing relieved him but assafoetida with *osmunda regalis*. During this time I had successively employed blisters, issues with potash, and moxas, to no effect. I at length applied burning irons to the lumbar region, so as to make about

half a dozen sloughs, a few inches long, and half an inch wide. From that time the patient recovered, by degrees, the movement of his inferior extremities; then was enabled to walk with crutches, next with a cane, and lastly without any help at all.

On a sudden, a swelling appeared in the left fossa iliaca. A manifest fluctuation took place immediately after. The deposit remained in this state during several weeks, without giving much pain, or changing the colour of the skin. It went down at last, and gradually disappeared, to shew itself again in the interior of the thigh, near the small trochanter, where it grew to the size of a foetus at full term. I endeavoured to stop its descent by placing a compressing apparatus below the tumor, fearing the matter might be conveyed to the knee. I determined the patient not to have it opened, and experience gave weight to my opinion. The tumor diminished insensibly, and had totally disappeared in about two months, leaving in its stead a small hard lump deeply situated in the thick of the thigh under the little trochanter, stationary, and in no wise preventing the natural movement of the leg. The elevation of the vertebræ affected by the tumor, was the only trace it left, and from that time till his death, occasioned by a typhous fever in 1811, no symptom ever after appeared of the disease.

Examination of the Body.

Head.—Effusion of thick lymph of a greenish cast, that lifted up the arachnoides. Ossification, some lines in breadth, of the anterior extremity of the falx. The aorta dilated about a third, from the place of its origin to the part where it bends, deeply tinged with red in its interior.

Abdomen.—The viscera to all appearance healthy. The thigh near the little trochanter presents a tumor resembling a meliceris digitated, interposing itself between the muscles, and between some of their fibres also, enveloped by solid cellular tissue, strongly injected. The matter was conveyed as through a canal, under Poupart's arch, following the interior edge of the sartorius muscle; then spread itself like a cake over all the iliac fossa, till digitating anew between the psoas, it terminated in the diseased vertebræ, and filled those cavities that the caries had formed.

Not doubting but that four of the lumbar vertebræ were more or less diseased in their body, or their articular apophyses, I carried away that part of the rachitis in order to examine it in detail. The body of the fifth vertebra had retained its full size, but was filled with holes that were supplied by new os-

seous juices. The inferior cartilage was unimpaired; the superior one had altogether disappeared. The body of the fourth vertebra had lost two-thirds of its upper parts, was joined by its articular apophyses to the third vertebra, which was disfigured, and had lost its thickness. A portion of the osseous juice formed a point or thorn over the second, and extending to the fourth, became a solid fulcrum. An isolated portion of osseous matter floated at large in an excavation between the second and fourth vertebræ. It was worm-eaten, and in form a perfect sequestra. The inferior part of the second vertebra was corroded; it leant on the third and on the edge of the fourth, forming together a solid seam or suture. The body and cartilages of the first were in excellent condition. The lumbar vertebra formed an obtuse angle with the body of the third.

It appears evident that, during this long disease of the spine, the caries of the vertebræ had been stopped in its progress; that the parts which the disease had separated, and rendered moveable, had acquired sufficient solidity and strength, in consequence of the flowing of the osseous juices; and that the medulla spinalis, ceasing to be compressed, had recovered its primitive energy.

About three years ago, on my road to the Glaciers of Chamouny, I was stopped at Salanches, to see a middle-aged woman, who had a fungus hæmatodes, that entirely covered the back part of her shoulder. A pyriform tumor like a goose-egg, of a livid colour, adhered to the scapula, near the arm-pit, by a stalk. It was of a spongy nature, diminishing by compression. Independent of this pendulous tumor, the fungus spread like an irregular map over the scapula and upper part of the arm. Many places were ulcerated, and the ulcers opening about once a fortnight, caused hæmorrhage, that was difficult to stop, and which had reduced the patient to extreme weakness.

The extraction of the fungus would have necessitated the amputation of the arm and shoulder. I conceived that the pain might be alleviated by the excision of the pyriform tumor, and the application of the actual cautery over the whole of the fungus. The patient consented to come to Geneva, and was put into the hands of Mr. Morin, a former pupil of mine; a consultation was held, which determined the trial of fire. After the excision of the tumor, the application of cautery was made so as to consume the fungus, by passing the burning irons rapidly over its surface, wherever it was perceptible to the eye. A wound to a considerable extent succeeded, which, on the falling of the sloughs, presented a granulated surface of a

healthy appearance, though it never could be brought to complete cicatrisation. An evident tendency exists to renewal of fungus, which no sooner appears than it is destroyed as at first.

This patient is not completely cured, but she has been saved from inevitable death. The hæmorrhage has ceased. The pains have disappeared. She can make use of her arm. Her existence in short is completely changed from a state of misery to one of comfort.

It is well known that teeth have been preserved by burning carious portions, and the pains put a stop to.

The ozema of the maxillary sinus, with polypous vegetation, can hardly be effectually cured without fire.

I have twice cauterized with success, carious ischiatic tuberosity; and in each case fire has determined the total separation of the tuberosity.

The most important precaution to observe in employing actual cautery is, to use the iron only when it is nearly white with heat, and to apply it instantaneously, so as to destroy the parts

it touches, while it scarcely heats those around them.

The contrary is the case where moxa is applied, a more general and less local action is required, and the slow burning of the cotton perfectly fulfils this intention.

FURTHER ACCOUNT
OF THE
RESULT OF AN OPERATION
FOR FORMING
AN ARTIFICIAL PUPIL.

EXTRACTED FROM LETTERS ADDRESSED TO

PROFESSOR SCARPA.

By J. P. MAUNOIR,

PROFESSOR OF SURGERY AT GENEVA.

Read April 14, 1818.

“ SINCE I communicated to you the result of the operations performed on the eyes of the Marquis de Beaumanoir*, they have undergone some remarkable alterations; of which the following notes copied from my memorandum-book may give you some idea.

“ Jan. 24, 1816.—That portion of the crystalline of the right eye which adhered to the new pupil has disappeared. The centre of the opening in

*** See Vol. VII. p. 301:**

the iris is of a clear dark colour : it is obscured in different parts of its circumference by a sort of veil resembling a thin gauze. Contrary to my expectation, and in consequence of the motion of the globe of the eye, I discovered an opaque portion of the crystalline about the size of a grain of millet-seed, immediately before the pupil. It was independent and moveable, and disappeared after a few minutes. On the marquis's looking down or stooping, it shewed itself as before, and again disappeared when he turned his eyes upwards, or held back his head. The progress, in point of transparency, of the pupil, has had little effect on the sight : the retina is weak : the moving of the above-mentioned substance in the humours of the eye, must disorder the sight. I trust it will soon be absorbed.

“ Feb. 3.—The extraneous body has disappeared. The sight is undoubtedly improved.

“ Since that period the progress has been rapid. In the latter end of February he could distinguish with his right eye, aided by a convex glass, capital letters of half an inch long. He can now, with the same assistance, read common writing in characters of an ordinary size. With his left eye, and by taking much pains, he reads a sentence in a common octavo. In his walks he sees the horizon around him, distinguishes objects, and tries to draw landscapes from nature, very imperfectly, as

may be supposed. Though he sees with tolerable distinctness any object in the direction of the horizon, he no sooner stoops than every thing becomes obscure. The gauze-like veil still exists in the pupil of the right eye. In the inferior part is seen a small immoveable fragment of crystalline; probably the same which was perceived rolling in the eye on the 24th of January."

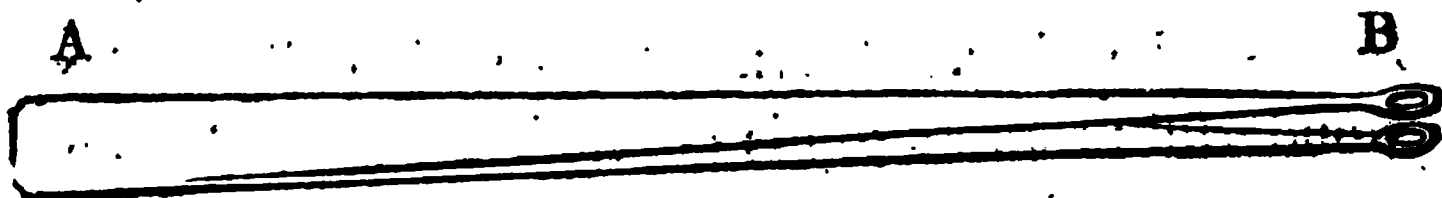
Some months after sending the above account to Professor Scarpa, I sent him also the following.

"The Marquis de Beaumanoir's left eye had a pupil of a very fine black: that of the right eye had still in its centre something like a thin spider's web. The moveable portion of the crystalline was now become fixed in the lowest part of the pupil.

"The marquis wished for a second operation which might destroy what he considered the chief remaining obstacle to perfect vision. I performed it in the following manner.

"The cataract knife of Richter was plunged, not in the direction of the tangent, but perpendicularly to the circumference of the cornea, into the external and inferior part of that membrane, so that the point penetrated into the middle of the new pupil. This simple puncture produced an incision of about two lines in length, into which I introduced pincers similar in shape to common polypus-pincers, of

a very small size. The two extremities are like an open spoon ; its length nearly that of A to B.



“ With this instrument I endeavoured to seize the fragment of the crystalline, but at the first attempt it disappeared altogether in the bottom of the eye. I succeeded better with the veil resembling a cobweb. The spoons of my pincers were filled with it, and I brought out a sort of opake jelly. I next introduced my double-button-scissors, and made an easy incision in the iris, so as to enlarge the pupil near the centre of the eye. The whole went on quickly, and without the patient's shewing any signs of pain.

“ After this operation, the eye healed in a very short time, no accident having retarded its cure : the sight appeared to be daily gaining ground. Since that time, the marquis has been to St. Gervais, at the foot of the Alps, for the benefit of the waters, where he took several sketches from nature, which are interesting, not only from the singular circumstances of his case, but from their real merit. Still he cannot see what is on the ground immediately below him, nor distinguish objects clearly without his convex glasses.”

“ Since the above was written, I have received several letters from the Marquis de Beaumanoir. He has been to Nice, where he found great benefit from sea-bathing. He mentions with delight the wonderful progress of his cure. He can read even by candle-light, the smallest printed and written characters. The drawings he sent me (still sketches from nature) are coloured, and have acquired great neatness. In a word, he sees as well as after the most successful simple operation of the cataract, since he assures me (in a letter from Lintz), that he cannot remember ever to have had a more perfect sight; that he pursues his occupations with the greatest ease, and is so independent as to walk in the streets alone at night without a guide.”

“ As I am of opinion that it is desirable to employ the buttoned scissors, in all cases of cataract, where there is a complication of the immobility of the iris, and its adherence to the opaque capsula of the crystalline, I shall terminate this memoir with an account of the following operation.

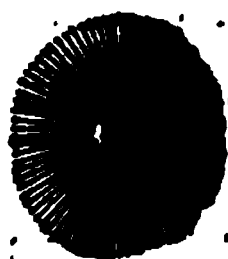
“ Dr. Carron, of Annecy, sent me, in the month of June, 1816, a young woman of about 26 years of age, whose right eye was affected with an opacity of the lens, and a complicated atrophy of the globe; there was also a cataract on the left eye;

but with that she could distinguish light from darkness. The pupil was very small, incapable of performing the least movement, and evidently adherent in its circumference to the opake capsule of the crystalline, so that the iris and the capsula formed one continued membrane. She was operated upon in the following manner.

“ I made an incision in the cornea, rather smaller than if it had been for extraction. Then with the pointed blade of my pupil scissors, I penetrated the iris at its inferior part, at the distance of a line from the circumference. I brought the blade in a vertical direction, as far as behind the crystalline: and when it arrived near the superior part, I shut my scissors, and thus cut the crystalline, its capsule, and the iris itself, in the direction of its axis or vertical diameter.

The pupil immediately became larger. The two segments of the capsule were separated, and shewed a broken crystalline of a bluish grey (that of the capsule was of a yellow-white). It became very easy to extract the crystalline, piece by piece, with a small scoop; and I then took out with the pincers the largest segment of the opake capsule where it adhered slightly to the iris. The pupil, rendered larger by the double section of the iris, remained, after the operation, of a very good size, and in the form of a weaver's shuttle. In consequence of which, I abandoned the idea of extracting the

other fragment of the capsule, as the taking it away would have made the pupil too large. The following figure represents the eye immediately after the operation and since its cure.



CASES
SHEWING THE COINCIDENCE
OF
WORMS IN THE INTESTINES

WITH
HÆMOPTYSIS,
AND
REMARKS ON THE PROBABILITY OF THE TWO
AFFECTIONS HAVING A CONNEXION WITH EACH OTHER.

BY NATHANIEL RUMSEY, Esq.

SURGEON, BEACONSFIELD, BUCKS.

COMMUNICATED

By DR. BATEMAN.

Read June 24, 1818.

THE object of the following pages is to express an opinion, that discharges of blood from the lungs are sometimes produced by the existence of worms in the intestinal canal, and to shew the probability that the removal of them may be followed by a recovery of the injured lungs; while on the other hand, their remaining the unsuspected cause, might with great probability be followed by a fatal phthisis. The opinion originated from observing the repeated

occurrence of the two affections in the same persons, and was strengthened by other considerations; while some circumstances which will be mentioned, seemed to justify the opinion of their having a relation to each other.

CASE I.

In December 1811, I was desired to see S. H., a young woman about twenty years of age, to ascertain if she were pregnant. She was unmarried, but had lately supposed, and upon oath declared herself with child; and it appeared probable that the period of gestation had expired, as she had spent some months in a female penitentiary, from which she had been discharged, because her enlargement had led to the opinion that she had entered the society in a state of pregnancy. She had now left it for three or four months. When I saw her, she moved with activity, and though looking large, was too small for a woman about to be confined. Her breasts were larger than formerly, yet they had not the appearance or feel of secreting glands. The areola was quite unaltered; the abdomen was large and prominent, not resembling the enlargement from a fluid in its cavity, but was of a more circumscribed form, like that of a distended uterus. The swelling was elastic and compressible, not having the hardness of a gravid uterus. The os uteri was low down in the vagina, and resembled that of the unimpregnated

state. The uterus, examined *per vaginam*, felt as if it contained a large body of fluid. She had a constant discharge like that of the menses, which had now continued six or seven weeks.

1812. February 1. She is in good health, gets no larger, therefore it is certain that she is not pregnant.

June 15. Has had several violent attacks of Hæmoptysis, accompanied with convulsive insensibility and agonizing pain of her side. Her teeth are firmly closed during the convulsion; the blood thrown up is frothy and of a bright red colour, having with it no mixture of the contents of the stomach, or any appearances of its coming from that viscus. She has had cough for many weeks, and seems in great danger of phthisis.

1813. October. Since the last date the Hæmoptysis has returned occasionally, and sometimes in quantities not less than a pint. Finding also that she occasionally discharged portions of a tænia, I prescribed a dose of the oleum terebinthinæ, which operated on the bowels, bringing away a considerable quantity of the worm. The tæniafaction went down; the Hæmoptysis returned many times slightly, but at length ceased entirely.

1815. She is reported to be well.

1816. She was again seen in perfect health.

CASE II.

Is stated from recollection ; but was committed to paper while all the circumstances were fresh in the memory, it not being at first known to have any connexion with the subject of this paper.

In the spring of this year 1817, I attended a young gentleman about ten years old for many weeks on account of a diarrhoea, for which he took a variety of aperient and astringent medicines without benefit. He had no fever, and seemed in general respects well, the diarrhoea continuing obstinately to resist the effects of medicine. During the continuance of it, two lumbrici were passed at distant times without appearing to produce any change in the state of the disorder. I was one night called up to him on account of the alarm which a coughing up of blood had produced in the family. The quantity was about an ounce, and certainly came from the lungs. He was bled and had no return of it. Shortly after this attack, a third lumbricus was voided *per anum*, after which, as if the three lumbrici had been the source of the long continued bowel complaint, he immediately began to amend, and rapidly recovered. A very trifling cough was left, which gradually got well. I had an opportunity of witnessing that he remained perfectly well eight months after the recovery. In this instance of Hæmoptysis there

was no spasmodic pain as described in the preceding case.

CASE III.

About three years ago, I was called to see a young woman, aged nineteen, in an advanced state of pregnancy, who was suffering from uterine hæmorrhagy: she was also suffering from a violent Hæmoptysis. She looked pale and thin, and I conjectured that she would fall a sacrifice to pulmonary consumption. She completed her time, was delivered, and resumed her usual employment. I heard nothing more of her until I was called to her in her second labour, which was accompanied with convulsive insensibility. About twelve months after her second delivery I was again called to her, on account of her lying in a state of convulsive insensibility, accompanied by coughing up a large quantity of frothy and arterial blood (certainly unmixed with any contents of the stomach). I bled her largely, and sensibility was restored. Within a short space I was called several times to her under similar circumstances, and always found bleeding of temporary use. Having before remarked the existence of worms in patients affected with Hæmoptysis; I asked if any had been ever been observed by my present patient, and was quickly answered in the affirmative. Some anthelmintic remedies were exhibited, which brought

away several lumbrici ; soon after which I again lost sight of her. Upon her applying to me again at the distance of six months from the before-mentioned period, I found she was troubled with cough, that she frequently brought up blood in the quantity of two or three table-spoonfuls, and that she had passed two lumbrici within the last fortnight. Her appetite was generally good, except that she had a peculiar aversion to meat. I ordered a draught consisting of *ol. terebinthinæ* ʒvi. *aq. menth. pip.* ʒss. to be followed by an infusion of senna if it did not operate. Many stools were procured, and twelve lumbrici brought away. She continued to cough and bring up blood as before, but without any appearance of fever ; nor could I discover that any symptom had been aggravated by the stimulus of the *ol. terebinthinæ*. The exhibition of turpentine was followed by an infusion of chamomile, given with a view to the improvement of the digestive organs ; and on the following day she brought away twelve more worms. She continues still to cough up blood occasionally, but without any attacks of convulsion or insensibility.

September 14. Within the last three weeks she has thrown up blood twice ; still her appearance is improved ; she goes to work in the harvest-field, and has passed only one worm since the last report, from which circumstance it may be presumed, however, that more remain.

October 20. She has parted with nine more worms.

As a farther proof of the occasional co-existence of worms with Hæmoptysis, I am induced to mention the following fact.

J. H. at the age of fifteen years was seized with Hæmoptysis, which recurred very frequently until he attained the age of twenty-five, when he died, I believe consumptive. During many years of his life he was troubled with a tænia, and it was his custom to remove portions of it from the rectum by winding it round a stick, in which way he used to exhibit it. No suspicion was entertained at the time that these two diseases had any connexion.

That Morgagni thought worms capable of producing pulmonary disease will appear from the following quotations: Morgagni, Liber II. De Morbis Thoracis Epist. Anat. Medica, XXI. Art. 43.

“ Verum ideo commemorabam, quod sermo de pleuritide erat eo die in academia institutus ob litteras a Cremonenti medico, dum viveret, experientissimo, qui condiscipulus meus fuerat, Ignatio Pedratto, ad me datas in quibus verminosas pleuritides summa cura describebat, quæ hyeme An.

1705, Farnesii, ubi tunc ille medicinam faciebat, in eaque vicinia epidemice grassabantur."

And in a former part of the same article, after relating the case of a young man who was affected with symptoms of pleurisy which did not yield to the usual remedies, he says,

"Denique rejecto inter vomitum sanguineum terete lumbrico, statim ab iis, quæ dicta sunt, omnibus liber est factus."

Again, Epist. cit. Art. 46. "Ex his quæ a nobis de verminosa pleuritide relata sunt, conjunctis tamen cum iis quæ de eadem supra laudati auctores scripserunt, jam tibi facile apparebit, nulla esse veræ pleuritidis signa, quæ non aliquando in illa quoque sint observata non modo cum jam in veram degenerasset, sed tum etiam cum hujus tantummodo similitudinem referret. Quo magis, in pueris præsertim, itemque in aliis qui soleant verminibus esse obnoxii, nec non in iis constitutionibus quæ horum feraces sint cavere medicos, oportet, ne forte pro vera habeant pleuritide aliquam in qua necdum aliud sit, nisi pleuritidis similitudo, solis anthelminticis curanda."

I have referred to various writers on the subject of worms, and meet with no intimation that they were ever suspected to be the cause of hæmorrhagy from the lungs. I have also referred to va-

rious writers on the subject of Hæmoptysis, and meet with no suggestion that worms had ever occasioned it.

It is indeed mentioned in Brookes's Practice of Physic, Vol. II. p. 220. that a woman who had been long troubled with a tænia, and was far gone in a consumption, met with a remedy which removed the worm; but she died of the consumption. So that the coincidence of worms and consumption in the same patient has been witnessed without any apparent suspicion of their alliance.

While the preceding facts had impressed my mind very strongly, that worms in the stomach or small intestines could give rise to an organic læsion of a distinct and distant organ, I fortunately met with a paper of De A. P. W. Phillip of Worcester, published in the Transactions of this Society, Vol. VII. Part II. describing a species of consumption which he naturally calls dyspeptic phthisis, in which it is satisfactorily shewn and illustrated that a disordered state of the digestive organs frequently produces phthisis pulmonalis. In perusing this valuable paper, I met with a reference to Mr. Abernethy's Observations upon the constitutional origin of local diseases, in which excellent work I met with the following opinion: "The observations which I have made in surgical cases lead me also to attribute many hæmorrhagies, and particularly those from the nose, to a sympathetic affec-

tion of the heart and arteries, excited by disorder of the digestive organs."

Cheyne, in his cases of apoplexy and lethargy, says, "I have witnessed some remarkable instances of profuse hæmorrhage from the nose preceded by disorder of the stomach and biliary system."

When I had read in the works of authors of such great experience and ability, opinions that a disordered state of several of the viscera of the abdomen, including those in which worms reside, had produced the rupture of blood-vessels and other organic changes, in organs distant and having no direct communication, I perceived that my own opinion was strongly supported by analogy, to the adoption of which, the unconnected state of the affected parts and mechanical nature of the injury had formed some impediment.

An assiduous medical student, diligent in pathological inquiry, (now Dr. Rumsey of Porto,) informed me, that in many dissections of bodies which had fallen victims to phthisis pulmonalis, he almost invariably found the liver as well as lungs in a diseased state.

My attention has also been arrested by accidentally meeting with an extensive tuberculated disease in the lungs and liver of a sheep.

I cannot contemplate these various facts without a very strong conviction, that disease of the abdominal is capable of producing disorganization of the thoracic viscera; and if it be possible that nervous disorder excited by local irritation could produce Hæmoptysis, there is no species of irritation more calculated to effect it than that of worms in the stomach and intestines, which, it is frequently witnessed, give rise to convulsion, and, as I have known, to epilepsy.

If the cases I have related are considered, they will be found to have a character which does not belong to the more common form of phthisis pulmonalis. The attacks of Hæmoptysis in the first and third cases were attended with convulsion, the former of which ended favourably after the removal of the worm; both the recovery and convulsion distinguish it; and though the subject of the latter remains by no means cured, she has continued, with diminished disease, an extraordinary length of time, and is much better at this moment in general health than she was three years ago. In the second case there has been no symptom of consumption except the single attack of Hæmoptysis; I suppose therefore that in this instance, the rupture of the vessel was not a part of more extensive disease of the lungs, but simply a mechanical breach occasioned by sympathy with a distant local irritation.

The fourth subject led a life of some activity for ten years while labouring under the two maladies.

The motive for communicating the preceding facts and opinion has been chiefly to awaken attention to the subject, in the confident expectation that it will be frequently found that worms produce Hæmoptysis, and that when occasioned by this cause, although there is great danger of consumption, the removal of the cause may frequently be the means of rescuing the subject from this usually fatal malady.

When I sat down to write, I had no other intention than that of delivering my opinion that a connexion subsists between the two affections, and of giving my reasons for it. As I did not consider myself to possess the knowledge of any remedies which the public are not acquainted with, I did not design to enter into the case. I am induced, however, to depart from this intention, because the public experience of one of the most anthelmintic remedies with which we are acquainted, the oleum terebinthinæ, has been but short, and I think this a convenient place for adding my own, little as it is, accompanied with what has occurred to my observation on the history of worms.

Their frequency as a disease in my circle of

practice I have thought remarkable. In a family of eight individuals, I once knew six to have worms, and I have seen a very great proportion of many other families afflicted with them. The poor and middling classes suffer most with them. I conclude that vegetable food, often ill-prepared, and eaten to excess, may be the chief immediate cause : but as if certain states of the constitution predisposed, I have noticed that in those families which are most troubled with them, there has been sometimes a scrofulous taint, and in one particularly, a great defect in the bony fabric ; many of the children have large heads and crooked legs. In one house, a boy about six years old was seized with convulsions and died, in spite of warm bath, blistering, and injections, before any thing could be got down his throat. The small intestines contained about a dozen lumbrici, as was discovered after death. An elder sister of this boy had died of chorea after a long continued suffering.

The existence of ascarides affords no presumption that there are not lumbrici. Observation has led me to suspect the latter the more, when I have found the former to exist. I believe that the lumbrici reside chiefly in the stomach and small intestines ; and the dissection of one subject has shewn me that they dispose themselves in the most curious and tortuous form, such as I thought exactly adapted to the exertion of their muscular power against opposite sides of their cylindrical

abode, resisting by this means the effect of the propelling motion of the canal, and thus keeping their station. An illustration of this mode may be found in the art employed by a chimney-sweeper to counteract the effects of gravitation by pressing against opposite sides of the cylinder in which he exerts his skill.

Experience has led me to believe, that but little dependence is to be placed upon medicines, simply purgative, for the removal of either species of intestinal worm. The strong action excited by calomel, jalap, senna, &c. may by chance hurry a solitary reptile to a postern grave; but they deserve no comparison with the specific antidote recommended by Dr. Fenwick, and of which so many subsequent communications attest the excellency. In following the directions of Dr. F. I have in several instances seen its powerfully good effects: but I shall trouble the reader only with its anthelmintic power when employed in a different way. A child about three years old, looking pale, with a very large abdomen, had occasionally voided a lumbricus. Purgatives were had recourse to with very little effect. I had not heard that the oleum terebinthinæ had ever been employed for the removal of this species of worm, and I did not think it justifiable to assail them with a full dose in so young a subject. I prescribed, therefore, half a drachm of the ol. tereb. and mixed with four drachms of thin mucilage of gum-arabic, to be

given twice or three times in the day. It was continued a week with some interruptions, within which space one hundred and twenty mostly full-grown lumbrici were brought away. I have seen several less remarkable instances of its good effect when thus diluted. I once prescribed a full dose in a case where I had great reason to suspect the existence of a tænia, portions having come away, without success. It was administered upon a fasting stomach, a state, in which I believe that this organ has its greatest power of digestion, and therefore possibly of converting the remedy to something less noxious.

In case of failure in the common mode of exhibiting it, might it not be reasonable to administer it shortly after a hearty meal, when the organ of digestion was fatigued? Would not the poison reach its destination, though mixed with food, less changed, and incommode the worms by its pungent properties applied to their surface?

I have sometimes seen the remedy produce alarming intoxication; but I once gave an ounce and a half to a man without any such effect, which operated in four hours, and brought away nearly thirty yards of tape-worm to the great improvement of his health in general, especially his liability to epileptic attacks. Administered to a young gentleman about four years old in the dose of one drachm, I saw it produce a great disposi-

tion to sleep, with paleness and coldness, which went off in a few hours.

To the well known fact of the destructive powers of fever to worms, I would add, that a few years ago, when the measles were epidemic in this town (Beaconsfield), a large majority of the children taken ill with them parted with worms, although they had not been previously known to be affected by them in any remarkable manner. I have often quoted this fact to my patients, in order to reason them out of a belief, that when in fever worms have been voided, they formed an essential part of their disease. It could be supposed by none of them that worms had occasioned the measles.

I think it right to add to the foregoing remarks, that I am not without suspicion that uterine hæmorrhage may also arise from the same cause. It existed in two of the cases described, and while engaged in writing this paper, I was called to a young woman who had been alarmed by having voided a worm (*lumbricus*). She suffers from menorrhagia every fortnight, which continues upon her with a violence that injures her general health. She has been subject to it many months, and has been married a year and a half without conception. A small dose of the *ol. tereb.* has in her instance removed several *lumbrici*; but the recent occurrence of the case prevents my adding any farther particulars.

TWO CASES
or
ANEURISM,

IN WHICH
THE TEMPORARY LIGATURE WAS EMPLOYED.

By B. TRAVERS, Esq. F.R.S.

VICE-PRESIDENT OF THE SOCIETY.

Read May 26, 1818.

THE following are the particulars of two cases, in which I removed the ligature at different periods after the operation for Aneurism.

CASE I.

John Smith, labourer, aged thirty-seven, was admitted into St. Thomas's Hospital in the beginning of February 1817. He had a tense diffused tumor in the bend of the right elbow, inclining towards the inner condyle; it was about the size of half a hen's egg, giving no pain when handled, and free from pulsation. The brachial artery could

be traced on its outer side, passing towards the radius; no pulse was perceptible in the ulnar artery. The motion of the joint was not at all impeded, but all the fingers and thumb, the little finger excepted, were benumbed, and he had nearly lost the power of extending or bending them.

He stated that about eight months previous to his admission he was bled; the cicatrix could be seen on the inner and lower part of the tumor, about an inch distant from the artery. Soon after the bandage was applied, the arm became generally swollen as far as the wrist; but by degrees, and under the application of lotions, the swelling of the arm subsided, and became more circumscribed around the orifice, pulsating strongly and distinctly, and continuing to do so until within a few days of his application at the Hospital.

February 14th. The tumor being considered aneurismal, the brachial artery was tied an inch and a half above the bend of the elbow with a noose ligature, so as to render its removal practicable if judged expedient. The pulsation in the radial artery immediately ceased.

15th. He had suffered considerable pain, which completely deprived him of rest during the night, but was this morning quite easy, and stated that the pain and numbness in the hand had consi-

derably abated ; the radial artery pulsated, but with diminished force ; in the ulnar no pulsation was perceptible ; the arm was of the natural temperature ; pulse about 70. At about six o'clock in the evening he arose suddenly from his bed, and stated a determination to quit the Hospital and return home, at the same time soliciting the removal of the ligature. He talked incoherently respecting his family, and became very turbulent towards night. Pulse 120 ; bowels had not been moved ; he took accordingly a purgative draught.

The person who accompanied this man to town stated, that previously to this attack he had occasionally been the subject of mental derangement, insomuch that coercive measures had been employed to restrain him.

16th. He had spent a night of incessant restlessness, and could with difficulty be kept in bed. He now took a dose of castor oil, and shortly had a copious evacuation of a healthy character, after which he became more composed. Pulse about 100. In the afternoon he was tranquil and collected ; at four, the ligature was removed with little difficulty, after having remained on the artery for fifty hours. The wound had adhered, except around the ligature, which was imbedded in coagulable lymph. In the evening he was again refractory and noisy ; had another full

motion ; no pulsation in the artery below the portion which had been tied.

17th. During the night he enjoyed about three hours' sound sleep. His brother visited him in the morning, since which he had been more composed. Pulse natural ; tongue perfectly clean ; a small healthy discharge of pus issued from the opening left by the ligature ; the pulsation in the radial artery was feeble ; nor could any be perceived either in the brachial immediately above the tumor, or in the ulnar artery.

18th. Had slept the whole of the night, and was perfectly tranquil and collected ; took a dose of castor oil, which operated briskly ; pulse was now 76, soft and free ; arm easy.

19th, 20th, and 21st. He continued improving ; pulse was natural ; no pulsation could be felt for some space above the part where the ligature had been applied ; wound appeared healthy and free from discharge ; the tumor became slightly discoloured and tumefied, but continued free from pain ; the white wash was applied. On the last of these days, after having spent rather a restless night, a slight inflammatory blush was seen surrounding the wound, which now discharged a small quantity of matter. On the 22d he had a slight recurrence of his mental

disorder; the wound discharged but little, and had rather a languid aspect; continued taking the aperient.

March 1st. The wound was now completely closed by granulations, which were rather spongy; a lotion of sulphate of zinc was applied; the tumor became less tense and more circumscribed; there was still a degree of numbness and pain in the hand; the pulsation in the radial artery was not so strong or so firm as before the operation, and in the ulnar was not at all perceptible; the artery was filled by a coagulum for some space above the wound, and below it a very faint thrilling sensation was conveyed to the fingers.

From the 1st to the 12th he continued improving daily; there was a slight disposition in the cicatrix to ulcerate, and the sac remained in the same state. He quitted the Hospital on the 14th of March of his own accord, and it was afterwards ascertained, that within three months from his removal he had fought two sharply contested battles, being a noted pugilist in his county.

CASE II.

William Edgecombe, lighterman, aged twenty-two, was admitted into St. Thomas's Hospital on

the 22d of November 1817. This man stated that he had been much employed in carrying heavy loads up steps and ladders. About three weeks previous to his admission, while stepping from one barge to another, he was attacked with pain in the right ham, and three or four days afterwards he perceived a swelling, but never observed a pulse in it until a day or two before his application at the Hospital. On examination, an aneurism of the popliteal artery was evident, and he suffered much pain both at the part and down the leg. His health was perfectly good, and he was free from other complaint.

28th. The operation was performed at one o'clock, and the artery was tied at the usual place with a noose ligature, so as to permit its removal.

Nine P.M. Inclined to sleep, which he had been prevented doing for a length of time in consequence of the pain; pulse 84 and full; limb equal in warmth to the opposite.

29th, one P.M. He had been restless during the early part of the night, but dozed since three o'clock; pulse 92 and soft; leg and foot of natural warmth and free from pain: Sol. Magn. Sulph. ad sedem.

Four P.M. The ligature was removed without

difficulty after an interval of twenty-seven hours ; no pulsation could be felt in the sac.

Seven P.M. A faint pulsation was clearly perceived in the sac.

30th. Had some pain during the night, but became easy and composed towards morning ; pulsation, though very distinct, was less strong than before the operation.

December 1st. He still complained of pain, though to a much less degree than prior to the operation.

2d. Pulsation continued ; he was otherwise doing well.

3rd. He had passed a good night ; quite free from pain ; pulsation much the same.

6th. The wound was dressed for the fourth time ; its edges were covered with healthy granulations, and the purulent discharge was in small quantity ; pulsation the same ; no recurrence of pain. Pressure was now applied by means of a roller from below the knee to the groin, and continued for the space of a month without inconvenience to the patient, during which time the pulsation in the sac evidently became feebler.

Jan. 10th. After sitting up in his bed on Wednesday the 7th, he felt a pain in the tumor, which continued increasing and at length became very severe; tumor very tense, and no pulsation could now be felt in it. Eight P.M. Pain was excessive; pulse quick, full, and hard; skin hot; sixteen ounces of blood were taken from his arm, and he took forty drops of Tinct. Opii.

Jan. 11th. The pain ceased entirely at one A.M. but returned at nine, and continued, though in a less degree; pulse quick and full; perspiration free and general; tongue rather furred; the tumor was more diffused and less prominent.

Three P.M. Pain increased; pulse 120; the blood drawn yesterday was sizzly and cupped; bleeding repeated: Ol. Ricini $\bar{3}j$.

. Seven P.M. Less pain since the bleeding; pulse about 110 and softer; bowels freely open.

12th. No increase of pain; pulse 108. At about two in the afternoon the pain increased, when ten ounces of blood were taken from him; this blood was a little cupped; pulse about 96, of moderate fulness; pain very severe; no alteration in the tumor. At two o'clock he was conveyed to the Operating Theatre, and the artery was again tied about two inches above the place

at which the former ligature had been applied. In the evening he was free from pain in the sac; limb was also warm.

13th. He had passed a comfortable night, and was free from pain; the leg was of a natural temperature; had had two motions previous to the operation, but none since: Sol. Magn. Sulph.

14th. He was cheerful and perfectly easy; the sac was diminished in bulk and more flaccid; limb warm; he had no recurrence of pain; the old wound was completely healed, but the recent one seemed disposed to ulcerate; he now partook of the house diet, and drank a pint of porter daily.

24th. The ligature came away with the dressing (12th day); wound still continued languid, though improving.

In a day or two after, Feb. 7th, he complained of pain in the right hypochondrium and at the scapula, and being feverish was seen by the physician. The wound continued improving until the 18th, when it was perfectly healed, and on the 26th he was discharged cured, with the usual degree of lameness.

Observations.

The case of Smith satisfactorily shews, that the residence of the ligature upon the artery for a period of fifty hours as certainly and completely answers the purpose of its application, as if allowed to remain until thrown off by the natural process.

In considering the case of Edgecombe, I think it evident, from the suspension of the pain and the diminished strength of the pulsation for a month following the application of the temporary ligature, that it had occasioned a degree of impediment to the current of blood in the artery; and these circumstances led me at one time to entertain a hope that the cure of the Aneurism was gradually accomplishing. But this was fallacious; and I may observe, that no such expectation ought ever to be entertained while the pulsation in any degree of the aneurismal sac continues. For the establishment of a collateral circulation is insufficient for the cure of the Aneurism, while the sac continues to receive a full jet of blood. I have seen a case in which the artery being obliterated below the sac, collateral circulation was established; yet the pulsation of the sac was undiminished and the progress of the disease unretarded. On the other hand, the arrestation of the pulse in the sac, unless attended by a diminution of its volume

and freedom from pain, affords no just ground for the opinion that the natural cure of the Aneurism is in progress; and if it be accompanied by an increase of the tumor, an aggravation of pain and the symptoms of inflammatory action, the reverse must be our conclusion: the operation is the ~~only~~ alternative, and cannot with safety be delayed. These symptoms are in fact those which occur where no operation has been attempted, and depend on the further yielding of the sac and surrounding parts. Let me repeat, that non-pulsation of the sac is a sign auspicious or otherwise, simply as it stands connected with increase or diminution of bulk and pain.

It is scarcely necessary to add to the narration of this case, my determination to relinquish the use of the temporary ligature. I should regret to hear of a repetition of the experiment, being unable upon reflection to discover a single circumstance tending in any degree to impeach its accuracy. But I am far from feeling regret that a practice has been fairly tried, of which I am free to confess I had formed too favourable an opinion; on the contrary, it is to me a source of high satisfaction, that the decision of the question, which I deemed of importance, has been obtained without loss of life or limb. The grounds of my expectation, and the motives which led me to institute the practice, will be seen by a reference to my papers in the fourth and sixth volumes of the

Society's Transactions; and it remains only that I should add one or two inferences from the above cases, before finally closing the subject.

1st. It appears that a ligature upon the divided carotid of the horse applied for twelve hours, may be removed without hemorrhage*; whereas the removal of a ligature upon the femoral artery of the human subject in twenty-seven hours, is followed by the return of the circulation in the vessel.

2dly. That although a ligature upon the carotid of a horse applied for six hours, has in a period of seventy hours been followed by a complete obstruction of its canal; a ligature applied for twenty-seven hours upon the human femoral artery, has scarcely afforded a perceptible impediment to the blood. Is this variation to be referred to a difference in strength or susceptibility of inflammation? or to the influence of mind upon the circulation? Does the comparative slowness of the circulation in the horse, or the difference in the force and direction of the current in the carotid and femoral arteries explain it?

3rdly. The adhesive union is prevented by the inclosure of a foreign body in a wound, long before suppuration has commenced. Suppuration is

* See Med. Chir. Trans. Vol. VI. p. 637, 640.

† See Med. Chir. Trans. Vol. VI. p. 647.

as certain to take place, though the ligature be removed after a few hours, as if it were left to be cast off; and the granulating process is more languidly performed after an interruption in its early stage, for the purpose of removing the obstacle to union, than where no such interruption has been given, and the obstacle has been removed by nature's own means. Hence it follows, that the theory, which, in removing the ligature within a given time, proposed the double advantage of a quicker as well as a surer process, fails in both points when brought to the test of practice upon the human subject. I might add for the sake of comparison a third case, in which I left the ligature to nature, and it was cast off on the 19th day, in the highest degree satisfactory. But this operation is sufficiently established and appreciated, and I am disposed to believe that, when properly performed, it admits of no improvement.

Since I had the honour of presenting these cases to the Society, Professor Scarpa has published a memoir on the ligature of the principal arteries of the extremities. In a series of experiments on the sheep, the dog and the cow, he ascertained that the carotid artery, compressed by a cylindrical roll of plaster under a flat ligature, was completely obstructed on the fourth day, its coats remaining entire. He relates four cases in which

the ligature thus applied to the arteries of the human subject was removed on the fourth day with success.

The following statement is extracted from the report of a conversation between the Professor and the Editors of the Journal of Foreign Medicine and Surgery*.

“ He said that he still continued to recommend a cylinder of waxed linen to be placed between the artery and the ligature, and that he had never once met with a secondary hemorrhagy since he began to employ this contrivance. He always made use of two ligatures, but in a manner, he said, which had none of the dangers of the *ligature d'attente*. During the operation, he was very cautious to separate the artery from the surrounding cellular substance to an exceedingly small extent, and having thus introduced the two ligatures under the artery, he tied one of them over the cylinder of linen, leaving the other not tied.” From his experiments, “ he had been led to conclude, that in the human subject the ligature might with safety, and with success to the operation, be removed on the fourth day. He would not however remove, he said, both the ligatures at that time. He would leave the one which had

* Quarterly Journal of Foreign Medicine and Surgery, No. I. page 30.

not been tied, in order that if the pulsation returned in the tumor, the artery might again be tied without any second operation. He then stated, at some length, the advantages of this early removal of the ligature over the present plan of leaving it perhaps fourteen days, insisting chiefly on the almost certain avoidance of secondary hemorrhagy, on the avoidance of a tedious suppuration in the wound, and occasionally of a troublesome sinus.

“ He said, that he considered this improvement in the operation for Aneurism as more valuable than all the *bagatelles*, as he was pleased to call them, which he had ever made.”

The professional science and character of Scarpa demand that every suggestion of his experience should be received with respectful deference. But the view which the surgeons of this country have been led to take of the operation of the ligature, must undergo a total change before they can acquiesce in his statement of the superior advantages of the method above described. It has been long well known that pressure will obliterate the canal of an artery, and in a late series of experiments I endeavoured to shew its efficacy in comparison with the ligature.

All the advantage which I proposed in removing the ligature, was the union of the wound by the direct adhesive inflammation, and of course

connected with this, the avoidance of sinuses and secondary hemorrhage. But finding that the removal of the ligature in a shorter time than admitted of its successful operation, would not procure this advantage; that the wound would still suppurate at the place of the ligature, and small as it was, would heal tediously; I have abandoned it, as failing of the point proposed.

The greater detachment of the vessel required for the introduction of two flat ligatures and a foreign body, than for the passage of a single round ligature, cannot be denied; therefore the good obtained by the removal of these substances, when the suppuration is completely established, as on the fourth day, can only be admitted as regards the practice of employing them*, which is objectionable, as it renders the suppuration more extensive, and the wound slower in healing, than if but one round ligature had been employed. But the practice of placing extraneous bodies in wounds, and, in general, of complicating operations, is so adverse to the genius of English surgery, that it is unnecessary to dwell upon these points; and indeed I may add, that the success of the operation as now generally performed in this country,

* I have been long in the occasional practice of applying the noose ligatures to the arteries of stumps, and removing them all at the first dressing. I have not known a single instance of secondary hemorrhage. This fact excited much surprise when I lately mentioned it to some Parisian surgeons of eminence.

seems to render all contrivances superfluous for the prevention of secondary hemorrhage.

In our appeal to experience, it should be recollected that the favourable execution of an ill-concerted operation affords a better chance of success than the mal-adroit execution of a good one. This and the difficulty or impossibility of obtaining an impartial history of what are called successful cases, render the decisions of mere experience somewhat equivocal. In a seeming equipoise of facts, we must call in the aid of theory to correct the balance and decide our judgments. Without this aid it would be exceedingly difficult to determine the eligibility of one operation over another, as, for example, not to speak of the broad and round ligature upon arteries, the different operations for stone, cataract, aneurism, &c. And although it is vain to hope that such points will ever cease to be the subjects of controversy, yet a conformity to certain acknowledged principles of science will always decide the question of preference with the majority of intelligent practitioners.

OBSERVATIONS
ON SOME POINTS RELATING TO THE
PHYSIOLOGY AND PATHOLOGY
OF THE
E A R.

By JOSEPH SWAN, Esq.
SURGEON OF LINCOLN HOSPITAL.

Read May 12, 1818.

OF all the comforts enjoyed by man, none is greater than that of perfect hearing; and when we reflect on the numbers that are deprived of it, and of the little good than can be done for diseases of the ear, this question naturally arises, whether it is owing to our ignorance, or to an impossibility, that we cannot cure them?

Insulated facts may at first be apparently trifling, yet when taken into the general account may produce something of the greatest importance. These considerations have induced me to bring this paper before the public, for as I have discovered an ana-

topical fact, which I cannot find anywhere taken notice of; and as it will account for some part of the physiology of the ear not before generally understood, it may lead to a perseverance in trying to supply some of the defects of that organ, and thereby render a great service to many labouring under its infirmities.

When the ears are stopped, and a watch is brought in contact with any part of the head, face, teeth, or neck; or if a stick, water, &c. be interposed between any of these parts and the watch, the sound will be heard as well as when the ears are open.

It has been supposed that the sound is mechanically conveyed through the flesh and bone in the same way, it is through a macerated bone, piece of wood, &c. but if it were so, it must be heard always when the auditory nerve is perfect, at whatever part of the head, face, &c. the watch is applied, but this is not the case. Where the hearing through the meatus externus has been perfect, and where there has been no apparent alteration in the structure of the head, face, &c. I have seen many who could hear from only one of these parts, and several who could not hear from any of them.

If I stop my ears and rest my chin on the petrous portion of the temporal bone in a macerated

skull, and place my watch in contact with any part of the skull, I can hear the sound perfectly. I saw a boy who was born deaf and dumb, but had been taught to speak, and when a watch touched the left side of his face, he could hear it; but when it touched any part of the right side, he could not in the least.

A man who was recovering from an illness, had become so deaf of the left ear, that he could just hear my watch when put very near it: he heard perfectly of the right ear. I desired he would stop his ears until he could not hear my watch when put nearly in contact with them; I then let it touch the left side of the face, &c. he just heard it; but when I let it touch the right side, he heard it distinctly.

If sound is conveyed mechanically through the flesh and bone, what in these two cases should hinder it from being heard distinctly, when the watch touched either side of the face, any more than in the macerated skull?

If sound is not conveyed mechanically through the head, face, &c. it must be through some other medium, and that I believe to be the porta dura of the seventh pair of nerves, and some other nerves connected with it.

On dissecting the seventh pair of nerves in

man, I find at the bottom of the meatus auditorius internus a communication between the portio mollis and portio dura.

In the sheep I have observed the same communication.

In fishes, several nerves that have a communication with the auditory nerve are spread on the skin over the whole head.

If we consider how the portio dura is connected by nervous substance with the portio mollis, its extraordinary course, its receiving the branch of the vidian nerve and the chorda tympani, and, when it has got out of the foramen stylo-mastoideum, its great expansion, I think we may conclude, that it was made to serve some greater purpose than has hitherto been ascribed to it.

That this provision of nature has been useful to deaf people, the following case, which may be found in Haller's *Prælectiones Academicæ*, will prove. “*Musicus fuit in aulâ, ex morbo factus surdaster, prehendebat vestibulum mordicûs, et tum omnino chelyn ex arte, pulsabat.*”

That it might be useful to many, could proper instruments be made, to increase the effect of sound, and especially to those who are deaf and dumb, if properly persevered in, is, I think, probable; but

it must be remembered, that where the disease is in the nerve, no good can be derived from it, which may be ascertained after a few trials by the expression of the child, if a sounding body is applied to the head, face, neck, or teeth ; and that many deaf and dumb can hear in this way, I am myself from experiment well convinced.

If from what has been said it should appear probable that sound is conveyed by the portio dura to the portio mollis in man, it will, I think, be reasonable to conclude, that the nerves which are spread on the soft parts of the heads of fishes, answer in a great measure the same purpose the tympanum does in man ; and though in man this provision is not necessary when the tympanum is perfect, yet when that is imperfect, it becomes the means of conveying sound to the portio mollis, and thus answers one of the most important purposes in the animal economy.

JOSEPH SWAN.

Lincoln, March 30, 1818.

ACCOUNT OF A CASE
IN WHICH SOME
SINGULAR PRETERNATURAL APPEARANCES
WERE OBSERVED IN
THE OVARIUM AND FEMALE BLADDER.
By EDWARD PHILLIPS, M.D.
OF ANDOVER.

Read June 24, 1818.

THE subject of the following detail which I have the honour of submitting to the Society, was a lady, thirty years of age, of a fair and florid countenance, and remarkably well formed.

From early life, she had at different periods found a difficulty in passing her water, and various domestic remedies were had recourse to with occasional relief; but as these attacks were but slight and transient, and the general health remained undisturbed, this occurrence did not excite any apprehension in the minds of the patient or her friends as to its probable future consequences.

About two years ago, she was seized with evident symptoms of inflammation of the bladder, for which she was under the care of Mr. Pitman of Andover. Bleeding, both general and topical, were had recourse to, and carried to a considerable extent, and this, with a rigid perseverance in the antiphlogistic plan, and the frequent use of the warm bath, so far subdued the disease, that she was in two months enabled to resume her duties as mistress of a school.

Notwithstanding the relief which she had received from the above treatment, her mind now became deeply impressed with the idea that "she was troubled with the gravel, or that she had something in her bladder;" but her almost unconquerable dislike to be explicit with her medical attendants, led her to be communicative only to her own sex as to the particular nature of her sufferings.

As great uneasiness with considerable tumefaction were at times felt about the hypogastrium, and there was an increased difficulty of passing the water, she was prevailed on to go to town, where she consulted two gentlemen of high repute, who concurred in recommending her to take alterative doses of mercury combined with the extract of cicuta, and oleaginous draughts. She persevered in the use of these remedies for a considerable time without experiencing any permanent benefit,

when in August last she became afflicted with new symptoms of a more alarming nature.

It was in this stage of the disease, and on September 20th, that my advice was first requested. Upon inquiry, we were informed that the seat of pain had been for some weeks past transferred from the region of the bladder to the left side, and she was sensible of a considerable fulness in that part of the body; the functions of the bladder were performed regularly, and the urine secreted did not indicate any disease of that organ; the catamenia had been regular both in quantity and quality; the countenance was flushed, the pulse rapid but weak, and she had frequent rigors which were followed by profuse perspiration. The pain was severe and of long duration, and it was felt, as she described it, from the swelling in the left side, through the back, and occasionally down the inside of both thighs. I visited her several times before I could prevail upon her to allow either Mr. Pitman or myself to examine the swelling complained of, which point being gained, we discovered a large indurated tumor, somewhat oblong in form, extending from the situation of the spleen to the umbilicus.

From all the circumstances, I was led to suspect that the tumor consisted of a diseased ovarium, and in this opinion I was supported by Mr. Pitman.

It may not be improper here to remark, that though (as it will appear from the examination *post mortem*) there had been such extensive mischief going on in the bladder, probably for some years, yet upon the ovarium's taking on a morbid action, all the symptoms of the former disease were suspended, and continued to be so until the patient was released from her sufferings.

As it was obvious from the general appearances of this lady, and the history which had been collected of her long and concealed symptoms, that disease was fast approaching to a fatal termination, it would be superfluous to lay before the Society a particular detail of the remedies prescribed, which could be adopted with no other hope than that of soothing the last days of her existence.

The symptoms continued nearly unaltered until within a week of her dissolution, when the abdomen became uniformly tense and swelled, the breathing much interrupted, and an almost constant sense of suffocation led the unhappy patient to pray fervently for the termination of her accumulated miseries, which desired event took place on the 10th of November.

Dissection.

The body was opened fourteen hours after death, by Mr. Pitman, jun. a young surgeon of great

promise, and the following particulars were the result of the examination.

On opening the cavity of the abdomen, there escaped about two gallons of water mixed with blood. On the *left side* of the umbilical region, there was an ovarian tumor, rather larger than a human heart, the contents of which were a semi-fluid substance a good deal resembling in appearance clouted cream. In the middle of this cream-like substance was found a tuft of hair about the size of a hen's egg. The surface of the tumor was nearly covered by clusters of hydatids, beautifully transparent and connected like a bunch of grapes. On the broad ligament of the left side of the uterus, there arose a number of small white tumors of the size of common peas. The uterus itself was not diseased. The bladder was very much distended, or rather plugged up with a substance similar to that which was contained in the ovarian tumor, and here also was discovered another large tuft of hair. The coats of the bladder were very much indurated, and particularly the inner coat. The urethra appeared to have no direct communication with the bladder, at the under and posterior part of which there was attached a small cyst having the same cream-like substance before described and also a quantity of hair, and what is deserving of particular notice, there was a perfectly formed incisor tooth having the enamel, and its fang firmly attached to the coats of

the cyst*. This cyst or cavity had a communication with the bladder by means of three small foramina, and it communicated also with the urethra on the anterior part.

* The preparation exhibiting these appearances is deposited in the Museum of the College of Surgeons. On examining it more accurately, it was found that the tooth was imbedded in a portion of bone resembling an alveolar process.

Andover, December 1817.

AN ACCOUNT
OF A
CONGENITAL MONSTROSITY.

By G. BRESCHET, M.D.

PROFESSOR TO THE FACULTY OF MEDICINE AT PARIS, AND CHIEF OF THE
CLINICAL DEPARTMENT AT THE HOTEL DIEU, &c.

Read June 24, 1818.

IN the month of January last, a woman, aged twenty-six, robust and well made, was delivered at the *Hôpital de la Maternité* of a child presenting many features of monstrosity.

The labour had lasted only a few hours, and the head of the child had presented in the second position. It gave some signs of life, but it continued to exist only during a few minutes. On examining the child, it was perceived that the placenta had been expelled along with it, and that they adhered together in a way that was very remarkable. The child had very nearly the ordinary dimensions of a foetus at the full time, and the mother reported, that in fact she had been brought to bed at

the end of the ninth month of her pregnancy. The dissection of this monstrous foetus having been consigned to me, I drew up the following description of what has resulted from my examination.

The last lumbar vertebræ and the os sacrum were affected with rickets, and had yielded so that the body appeared to be bent double, and the thighs, legs, and feet came to correspond to the regions of the back and neck. The placenta was smaller than usual; its uterine surface was mamelated, and still presented, at every point, the vestiges of the epichorion (*membrana decidua*); its foetal surface was furrowed by very distinct vessels, among which only a single artery could be distinguished.

There was, properly speaking, no umbilical cord, the placenta being applied to the abdomen, of which it completed the parietes. At the point where the umbilical cord should have existed, the membranes, both amnios and chorion, were seen quitting the umbilical artery and vein, and passing on to contribute their share in forming the abdominal parietes, being inserted at the superior part to the skin near the epigastrium and lateral parts of the base of the thorax. Below, and posteriorly, these membranes terminated, in like manner, in the skin of the inferior part of the trunk, in a situation corresponding nearly to the circumference of the pelvis. The amnios could be distinctly

perceived to be continued with the epidermis, or external covering of the skin; and the chorion to dip and lose itself in the true cutis, or deeper layer of that organ. Yet in the spot where these two membranes of the ovum were united, they lost abruptly their transparency, and a line of a vivid rose colour marked the termination of these membranes, and the commencement of the skin. Through these two membranes, on the upper part, the convex surface and the anterior edge of the liver were distinguishable, occupying the whole of the superior portion of the abdominal cavity. In the lower part, both before and behind, there appeared the convolutions of the intestines and the umbilical veins, separated from each other throughout the whole of their course. As these vessels emerged from that surface of the placenta which was facing the abdominal viscera, it is easy to understand that no umbilicus could exist, and such was in fact found to be the case. On cutting open these membranes, which completed the parietes of the abdomen, we saw the umbilical vein coming forwards from the posterior part of the trunk, (that is, in reality, from the inferior part, since the trunk had been inflected backwards in consequence of the distortion produced by rickets,) towards the left hypochondrium, extending to the superior surface of the middle lobe of the liver, and burying itself in a groove hollowed out of the superior surface of this lobe, in order to reach the anterior edge and concave surface of this organ, where its

trunk opened into the left branch of the vena portæ. At this point a small branch was seen to proceed and open into the vena cava ; thus it constituted the canalis venosus.

It has been already stated that the umbilical artery did not accompany the vein, and was not disposed in a spiral round it, as is the usual structure. This single artery was very tortuous, and was surrounded by a very loose lamellar texture, which did not cover the membranes amnios and chorion, as takes place in the natural conformation of the foetus. This vessel terminated in the left iliac artery.

The head presented no deviation from the natural structure. The chest, the cavity of which was very restricted in a direction from above downwards, contained the heart, whose shape approached more nearly to that of a sphere than of a cone. The canalis arteriosus presented a calibre equal to that of the aorta. The lungs were small, but in other respects natural. The left lung was of a rose colour, yielded a crepitus, apparently from air which it had received. The right lung was of a darker colour, was denser in its texture, did not crepitate, and seemed to contain no gaseous fluid. The former, immersed in a vessel of water, floated ; while the latter sunk to the bottom. Similar experiments made on small portions only of these two lobes, gave the same results.

The thymus was very large; the liver was also of considerable size, and presented no marked superiority in volume of the left over the right lobe. The gall-bladder, the spleen, and the pancreas offered nothing particular. The intestinal canal was remarkable only by the dilatation of the rectum, and its opening externally in the middle of the organs of generation.

The left kidney was much developed, was composed of many lobes, covered by a very large capsule. The right kidney did not exist; but a suprarenal capsule of the same size as that of the opposite side was found. The ureter terminated in the genitals.

The uterus had the figure of a cone, of which the apex situated in the pelvis terminated in the fallopian tube and ovarium. It appeared that the right fallopian tube and ovarium was the one that was wanting. The vagina was obliterated. In the part where the external organs of generation are usually situated, nothing could be distinguished but a reddish surface of a circular form, of which the irregular edge formed a slight ridge. At the lower part of this surface were two openings, of which the one led to the rectum, and the other to the ureter: the red surface just mentioned was formed by the remains of the urinary bladder, of which the anterior side was wanting, and consequently exhibited the orifice of the ureter which

terminated upon it. This defective conformation has already been observed and described by many authors. (I have given the history of it in the *Dictionnaire des Sciences Medicales*, under the head of *Extroversion* or *Ystrophie*.) On this same surface a large projecting tubercle could also be distinguished, composed of fatty cellular substance.

The texture of the skin presented nothing remarkable, except in the abdomen, where it was united with the membranes of the ovum. On the upper part of the thighs, however, two large folds were discernible, which upon dissection proved to be the vestiges of the labia pudendi. Their remoteness from the situation they usually occupy, is explicable by the bending backwards of the inferior part of the trunk.

The cellular texture, as well as the fat, was dense, close, and granular. The muscles of all the upper parts of the body, as also of the left inferior extremity, were red and very distinct. Those of the lower part of the back and of the loins, were pale and scarcely recognizable. Lastly, the whole right inferior extremity was entirely destitute of muscles. The most attentive examination and most careful dissection could not enable us to discover in it the least trace of fleshy fibre, of aponeurosis, or of tendon. The whole limb was equally devoid of nerves, while in the left leg and thigh both the muscles and the nerves were

very visible. The blood-vessels were much less numerous, and much smaller in the former member than in the latter. Only a few venous and arterial ramifications could be perceived, but the trunk of the crural vessels was contracted suddenly near the middle of the thigh, and was lost in the fat of that part. Thus the right limb was formed only of the skin, the bones with their ligaments, and an adipose substance of a yellow and rose-coloured tint, which possessed greater consistence, and was less granulated than the fat of other parts. We thought we had detected the commencement of a transition to the state of adipocire, and therefore collected portions of this matter in order to subject it to chemical analysis. Our friend Dr. Magendie entrusted the task to Mr. Chevreul; but the result has been that this substance was not adipocire, and did not differ in its properties from the fat of other parts of the body.

The osseous system in all the upper part of the body presented nothing extraordinary; the vertebral column was bent near its lower part and along the whole length of the sacrum. The right os ischium was articulated with the sacrum, and strongly turned backwards; that on the left side was separated from the former near the pubis, and was not retroverted; but the femur was articulated on the cotyloid cavity, and the whole of the left limb was carried backwards. The bones of the

whole right inferior extremity were more slender than those of the other side. Lastly, there was an opening in the posterior and inferior part of the lumbar vertebræ and of the false vertebræ of the sacrum, on the right side. This opening constituted a true spina-bifida. When dissecting the soft parts, we had found a slight tumor, soft to the feel, but without any distinct fluctuation: it was formed by a small subcutaneous cyst, containing a little semi-liquid matter, in some measure analogous to the cerebral substance when softened by decomposition. The lumbar and sacral nerves, which usually arise from this part of the spinal marrow, did not exist.

To recapitulate the interesting points which the examination of this monstrous foetus has unfolded, we find as follows :

1. Curvature from rickets; the lower extremities turned back, so as to correspond with the posterior part of the trunk.

2. The placenta applied to the abdomen.

3. The membranes of the ovum contributing to complete the anterior side of the abdomen.

4. The absence of the umbilical cord, or to speak with more precision, the vessels which usually compose this cord, not twisted together, one

artery, with the vein, passing by the left hypochondrium to the upper surface of the liver, and thence proceeding to its concave surface.

5. The absence of the kidney on the right side.

6. The absence of ovarium and fallopian tube on the same side.

7. The separation of the os pubis, and retroversion of the right os ischium.

8. The bladder appearing externally, and presenting only its posterior surface, on which the orifice of the left ureter could be seen.

9. The anus, situated a little underneath this orifice of the ureter.

10. The obliteration of the vagina.

11. A spina bifida, or destruction on the right side of the processes of the last lumbar vertebræ, and of the posterior side of the spinal canal of the os sacrum.

12. The total absence of nerves and muscles of the whole of the right inferior extremity, and their place being occupied with a species of solid fat.

13. Deficient development of the bones of the same limb.

I have confined myself to the description of the fact, and all the details relating to it, without seeking to draw any conclusion from them. It has appeared to me deserving of attention, and for that reason I have ventured to communicate it to this learned Society, leaving every one to form his own deductions. I shall conclude by saying, that every thing I have described has been seen by Professor Chaussier, and that the preparations have been shewn to a great number of students who attend the Lectures on Physiology given at the Faculty of Medicine, and also my Anatomical Lectures; so that no doubt can be entertained as to the truth and accuracy of the observations here recorded.

G. BRESCHET.

ON THE
COMPARATIVE INFREQUENCY
OF
URINARY CALCULI
AMONG
SEAFARING PEOPLE.

By A. COPLAND HUTCHISON, Esq.

SURGEON EXTRAORDINARY TO HIS ROYAL HIGHNESS THE DUKE
OF CLARENCE, SURGEON TO THE WESTMINSTER GENERAL DISPENSARY,
AND LATE SURGEON TO THE ROYAL NAVAL HOSPITAL AT DEAL.

Read May 12, 1818.

ON perusing Dr. Marcet's valuable essay on the chemical history of the different species of Urinary Calculi, and the medical treatment of the diseases consequent thereon, I was pleased to find that he had embraced the subject of the comparative frequency of calculous disorders in certain countries and districts, although he candidly acknowledges, that it still remains for future inquirers to discover, whether the frequency of stone cases in one particular district over that of another, be imputable to some peculiarities in the habits and occupations of

its inhabitants, or to locality of situation and climate.

Impressed with the importance of the subject as it regards a knowledge of the disorder, its pathology, and treatment, which such an inquiry cannot fail materially to promote ; and feeling it to be the duty of every professional man to contribute the result of his observations in aid of an investigation so ably commenced ; I beg leave to submit to the attention of the Society a few remarks on the comparative infrequency of calculous disorders among seafaring people. I feel myself the more strongly impelled to the task from having noticed the circumstance many years ago, and from the distinguished author of the above essay not having devoted any portion of his work to the consideration of a class of men, to the treatment of whose diseases my attention has been principally directed for a period of sixteen years.

The number of seamen and marines annually voted by parliament to man the British navy, from January 1800 to the 31st of December 1815, has on an average amounted to 132,000 ; now if we take into consideration the vast expenditure of human life by battle, disease, and various other casualties, and which unavoidable loss is necessarily required to be constantly replaced, the total number cannot be estimated at less than 162,000, making an annual fluctuation of 30,000 new raised

men to supply the deficiencies; but we must bear in mind, that nine-tenths of this number were men who had served at sea from a very early period of life, or, in other words, were old and experienced seamen*.

I have taken considerable pains to ascertain the prevalence of calculous disorders in the naval service, and the result of my inquiry is, that out of the mass of individuals of which it is composed, only *eight cases* have occurred in the period of the

* The number of men lost to the service from various causes during three of the last years of the war I procured at the Admiralty Office, and is as follows :

In 1811.....	33,898
1812.....	27,009
1813.....	26,049

Seamen and marines voted by Parliament } for each of these three years.....	145,000
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The average loss of these years gives only about 29,000 in place of 30,000 as stated in the text, and according to the number voted it makes a waste of about one in five; but in these three years the war was chiefly conducted at home, the number of ships serving on unhealthy stations was considerably reduced, and during this period no general action had been fought at sea. There is another circumstance which caused a greater waste in the earlier years of the war than has been here stated from documents, namely, the very little prospect that appeared to the seamen of any termination to hostilities, which certainly influenced the men to desert in greater numbers than in the last years of the war, when the probability of a speedy termination of their labours and consequent liberation was at hand.

sixteen years before specified, all of whom had been operated upon in the naval hospitals of Haslar, Plymouth, or Deal, and of whom one only died. In the other royal hospitals, namely, Yarmouth and Peignton, no patient labouring under Urinary Calculus having been admitted, I have purposely omitted taking them into the account, as well as the foreign hospitals of Halifax, Jamaica, Antigua, Barbadoes, Gibraltar, Malta, the Cape, and Madras; being satisfied, after the strictest examination, that the operation of lithotomy had never been performed at any of these establishments. If cases of this kind had occurred abroad, and owing to the unfavourable nature of the climate or other causes, the surgeons had deemed it not advisable to operate, the patient so circumstanced would have been forwarded to the great naval hospitals at home; and, therefore, we shall be fully warranted in concluding, that eight cases of stone only had really occurred among the vast mass of seamen and marines composing our naval force at home and on foreign stations during that eventful era, that is, between January 1800 and December 1815.

The commissioners for conducting the sick and wounded department of the navy, with their accustomed liberality, directed that I should be furnished with the subjoined document, shewing the total number of seamen and marines received into the three hospitals during the above sixteen years,

exclusive of soldiers, Russians, and prisoners of war, making the grand total of 96,000, which, on deducting in round numbers 10,000 for gunshot wounds, accidents, &c. admitted into the hospitals beyond the average number of such cases received into the London and provincial hospitals on account of the peculiar service to which the naval hospitals are appropriated, gives only one calculous case in 10,750 patients.

VICTUALLING OFFICE, 23rd MARCH, 1818.

AN ABSTRACT

Shewing the number of sick and wounded seamen received into Haslar, Plymouth and Deal Hospitals between the 1st of January 1800 and the 31st of December 1815.

YEAR.	1800	1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	TOTAL
HASLAR....	4835	2781	1925	1144	1496	1727	1900	1892	1907	2521	3236	3273	6018	2890	3256	2442	40,043
PLYMOUTH	6028	4683	2111	1420	3596	3490	3137	1897	2453	2624	3019	2660	2806	2917	3644	1967	48,452
DEAL.....	965	538	92	226	548	554	391	357	562	781	625	347	658	585	584	389	8,202
GRAND TOTAL.....																	96,697

By order of the Board, (signed) J. T. LEE.

Dr. Marcet states the proportion of stone cases received into the different British and Continental public hospitals, Norwich alone excepted, to be *one* for every *three* or *four hundred* patients of all descriptions admitted. In the Norwich hospital it appears to be ~~one~~ in every *thirty-eight* cases, a proportion prodigiously great, and which places in a striking point of view the untoward prevalence of this afflicting malady in the Norfolk district over that of every other throughout Europe, as far, at least, as our present knowledge extends, from whatever cause that extraordinary circumstance may arise. The paucity of stone cases occurring in tropical climates has also been remarked by Dr. Marcet; and as far as the fact already stated goes, of no patients labouring under the disease in question having been admitted into our foreign hospitals, it tends to strengthen the observation.

Of the eight cases of calculous concretions before mentioned as having occurred out of the vast mass of patients admitted into our naval medical establishments in England, two were boys about fourteen years of age, who had laboured under symptoms of stone for some years previously to their admission into the service, and into which they had recently entered expressly for the purpose of deriving benefit from our magnificent institutions; one was a marine, about twenty-two years of age, who had been at sea a few months only; three were adult seamen, and the seventh

a marine ; but their length of service afloat *could not be at all* ascertained* : the eighth and last case was a warrant officer, advanced in years, who had been serving in ordinary, that is, in a ship in harbour, for a considerable time previously to the operation, and the only case which terminated fatally.

For these short historical particulars I am chiefly indebted to my friend Dr. Baird, inspector-general of naval hospitals, who with his wonted zeal for the public service, furnished me with the above facts†.

In the admissions into naval hospitals, both officers, under the rank of captain, and privates are included ; and excepting the case of one warrant officer, whose diet differs not materially from that of the seamen, it will be found that no officer has undergone the operation of lithotomy in any of these establishments. It is but just, however, to notice the cases of two naval gentlemen, the one a captain, the other an hospital surgeon, who were operated upon in London, as I have been since

* Since this paper was sent to the press, the author has ascertained that one of these patients cut by Dr. Veitch at Plymouth Hospital, was a Prussian by birth.

† Subsequently to the period embraced in these returns, viz. in May 1816, a boy was operated upon in Haslar hospital and recovered, who had been turned ashore from a merchant vessel at Barbadoes. and was by the captain of the *Espiegle* sloop of war humanely taken on board and brought to England for the purpose of undergoing the operation.

informed ; but whether the first contracted symptoms of the complaint at sea or while residing on shore, I have not been fortunate enough to discover.

It is necessary to observe, that the general food of the superior classes of officers is infinitely more acescent than that commonly used by the seamen and marines ; and also, that they command distinct apartments to sleep in, more cool, and consequently better ventilated than the parts appropriated to the men ; but the water for general use is common to every description of persons on board ships of war.

In well regulated messes of the principal officers, their diet differs but little from people on shore ; but with respect to other classes of the ship's company the difference is considerable, as they are unavoidably compelled to subsist often, for months successively, on salt beef and pork.

On the ship's arrival in port, the men are amply supplied with good fresh beef, vegetables, and sound table beer while victualling and watering, which, however, in time of war, is generally limited to a very short period, especially when commanded by an active and zealous captain. On those occasions, it is incredible to see what quantities of salt the seamen will use with their fresh beef. During their stay in port, and for some days after, each man is allowed a gallon of good beer ; and at other

times, when this wholesome beverage can no longer be procured, a pint of wine or half a pint of spirits in lieu thereof: the latter previously diluted with three portions of water, is served out daily to each man at two distinct periods.

The beef or pork commonly issued to the ship's company at sea is so highly salted, and frequently kept so long in its briny pickle, that its bland and nutritious juices are in great measure exhausted. Excepting in ships of war of the first and second rate, a portion of one deck only is appropriated to the whole ship's company to sleep in, and this is consequently so crowded with hammocks, and the men so impacted together, (fourteen inches in width being the total space allowed to each individual,) that some dexterity is requisite to obtain ingress and egress to and from their beds. The lower deck being always the part allotted for repose, the ports are for the safety of the ship necessarily closed all night, and the temperature of the surrounding air is thereby so exalted, that the place becomes a kind of steam-bath from animal exhalation, the men being literally immersed in their own perspiration*.

Dr. Dobson remarks, that calculous disorders

* See Sir Gilbert Blane's excellent paper on the comparative health of the navy, published in the sixth volume of the Transactions of this Society ; and also, some practical Observations in Surgery by A. Copland Hutchison, published in 1816, pp. 77 and 78.

are much more frequently met with in the cyder counties than in other parts of England* ; and as it would appear from what has been here advanced, that seamen who have rarely opportunities of indulging in the use of malt liquors, are in great measure exempt from urinary concretions, it may therefore be asked, whether all kinds of fermented liquors be not favorable to the production and accretion of such disorders ?

From Dr. Marcet's and Dr. Prout's remarks it would appear, that an active and healthy state of the digestive organs is one of the most effectual preventives against the formation of Calculi. May it not therefore happen, in the instance of seafaring men, that the peculiarities of their regimen, and especially the great quantities of muriate of soda they habitually take with their food, contribute to produce this effect† ? or in other words, shall we be justified in imputing to the stimulus communicated to and maintained in the whole chylopoetic viscera by the muriate of soda, a power to counteract the aggregation of calculous matter in the urinary organs independently of any direct chemical agency ?

* See Dr. Dobson's Commentary on Fixed Air, 3d edition, published in 1779.

† See Dr. Marcet's Essay, page 176. and Dr. Prout's valuable paper in the eighth volume of the Transactions of this Society, pages 543, 544, 545.

It has been already stated, that seamen belonging to ships of war are so closely impacted whilst in their hammocks, that they continue suffused with perspiration during the whole period allotted to repose : and there is also such a perpetual mutation in the various stations appointed to ships of war to cruise in, that few seamen escape the performance of their round of duty in tropical and other hot climates, bearing an equal proportion to the time spent in the more temperate climate of Europe ; and consequently there must be a much more profuse discharge from the exhalants on the surface of the body of this class of men, than of those residing in Great Britain or in more northern latitudes.

I am the more particularly induced to notice these circumstances, because it has been ingeniously suggested among other causes, “ whether there may not be some essential connexion between the state of the cutaneous functions and the greater or less prevalence of this class of disorders* ?”

That an intimate connexion does subsist between a particular state of the cutaneous functions and a tendency in the urinary secretions to form calculous concretions, I am inclined to believe ; but in this early stage of the inquiry into the grounds for such opinion, I deem it more con-

* See Marcet's Essay, page 44.

sonant to the circumspection necessary to be observed in speculative medicine, to withhold the view which I have taken of this part of the subject, till confirmed by more certain and conclusive *data* than we at present possess.

With the view of ascertaining with every degree of accuracy, and through every possible channel from which information could be derived, the validity of the opinion herein maintained, of the almost total exemption of seafaring people from calculous affections, I made due inquiry of Sir E. Home and my friends Messrs. Cline, sen. and Astley Cooper, whether, in the course of their extensive practice, both private and public, they could recollect having performed the operation of lithotomy on any of the description of persons here alluded to? The two former gentlemen fully answered in the negative, to the best of their recollection at the time; and Mr. Astley Cooper informs me, that he had been consulted a few years back by Admiral B. D——s, then labouring under evident symptoms of stone, but that he had not been operated upon; the stone, however, was ascertained to be of that species called Mulberry, by a portion being broken off by the sound and passed *per urethram**.

* Admiral B. D. died only about six months ago, and I learn at the Admiralty Office that he had *not* been employed at sea for the last twenty years of his life.

Excepting this solitary case, conjoined, however, to that of the captain and hospital surgeon before mentioned, Mr. Cooper stated that no other instance had occurred in the course of his practice. This eminent practitioner also asserts, that the surgeon here alluded to had been affected with calculous symptoms from his very *childhood*.

The circumstance mentioned by Dr. Dobson, page 153. of his work, likewise deserves notice in the present investigation, viz. the rare occurrence of stone cases in the Liverpool hospital, compared to that of other public institutions appropriated to similar purposes. May not this singularity arise from a great proportion of patients admitted into the hospital of this great emporium of British commerce, being composed of seamen or seafaring people?

The various and concurring facts already enumerated, tend to illustrate and confirm the position we are endeavouring to establish, namely, that there is something in the occupation, food, drink, and general habits of seamen, added to frequent change of climate, which render this class of men more peculiarly exempt from calculous depositions than any other.

The life of a seaman is one of great activity, and often of considerable labour and exertion. I have frequently observed in common with other

officers, that sailors never fail to empty the bladder on the first symptoms of distention; and the facilities afforded them as far as regards unmixed society and locality favour greatly this salutary habit. It is also of importance to notice, that no description of people are less subject to dyspepsia*, or more prone to strictures in the urethra.

People of sedentary habits, on the contrary, offer great facility of aggregation and increase to any minute calculous depositions in the bladder, where they gradually acquire magnitude by continual accumulation of fresh matter, so as to render the distress and acute sufferings of the patient intolerable, and compel him to submit to the operation of lithotomy as the only mode of obtaining permanent relief: and hence it is, that lawyers and other studious men who sit much, and are in habits of retention, are said to be more subject to the disease in question, than those devoted to the more active scenes of life and greater muscular exertion †.

To these observations it may be objected, that Calculi are more generally formations of early youth than those of adult or of advanced age; and the men who enter or are impressed into the public service undergo an examination respecting

* See various parts of Murray Forbes's work on Gravel and Gout.

† See also page 38 of the same work.

their state of health, and are rejected if found to be labouring under any serious complaint ; but when we reflect on the manner of carrying on the surgical examination on these occasions, it will be acknowledged by those best acquainted with the nature of that service, that they are not *particularly* scrupulous as to admissions : besides, it has been shewn in the cases of the two boys operated upon, that they entered the navy for the express purpose of getting cured, and consequently took care to conceal their disease. The fact is, that boys are frequently embarked at the early ages of nine or ten years, and when we take into consideration the vast exertions made by officers, and the various impress gangs to man ships of war fitting in harbour, or to keep up their numbers in those already at sea, the validity of the above objections will be greatly lessened, if not wholly removed.

Again, in the number of patients received into the naval hospitals, as compared to the admissions into the different London and provincial hospitals, it must not be forgotten, that in the latter, those admitted are composed of both sexes, whereas in the former, the admissions are confined solely to the male sex ; and it will be found on a reference to Dr. Marcet's report from the Norwich hospital, (page 26,) that the proportion of females operated upon, is to that of males as *one* to *seventeen*. It is therefore but just that these facts should also have their due weight in balancing the argument.

Moreover, it is not to be omitted, that out of the *eight* cases stated to have been admitted into the naval hospitals from 1800 to 1815, both years included, *three* out of the eight were known to have entered the service labouring under the disease ; so that in point of fact, *five* only are justly to be considered as having originated among the vast mass of individuals composing the British navy in the eventful space of sixteen years, and these years of unexampled efforts and more strenuous exertion than any in British annals*.

In that magnificent and extensive asylum for decayed seamen, the royal hospital at Greenwich, Dr. Robertson, the physician to the institution, informs me, that during his professional attendance there for twenty-seven years, he cannot recollect a single instance of the operation of lithotomy having been performed, and only one case in which symptoms of Calculus were manifest. He states, however, that in dissecting he discovered small Calculi in the kidneys and ureters of some of the pensioners after death.

The number of mutilated or otherwise infirm seamen and marines accommodated in that noble institution, exclusive of officers, is 2710 ; and the admissions on an average annually to fill up the

* *Five* cases of stone occurring out of 86,000 hospital patients give only *one* in 17,200.

vacancies occasioned by death or removal as out-pensioners, is about 213. All ages, from twelve years to the most advanced period of life, are eligible for admission.

From various parts of the preceding premises, then, we may with some degree of probability infer, that animal food, combined with a certain portion of the muriate of soda, in conjunction with farinaceous aliment, on which seamen principally subsist, are favourable to the prevention of calculous aggregation.

To acquire this prophylactic property, it may be essential that the animal food should be saturated with salt previously to its use, as we learn from Dr. Wollaston, that when free from saline matter, animal food favours the generation of lithic acid, at least in carnivorous birds* : whether similar effects follow its application to the human stomach, has not yet been ascertained, I believe ; but reasoning from analogy, we might be induced to conclude that such would be the consequence.

With respect to the practical inferences to be deduced from almost the total absence of calculous disorders in tropical regions, the exhibition of sudorifics would appear to be indicated, as offering a prospect of preventing the malady altogether, or

* See Philosophical Transactions for 1810, page 229.

of alleviating its further progress when once established. It is well known that the cuticular excretions are vicarious with the renal secretions, and the most superficial observer must have witnessed, that when the cutaneous discharges are abundant or increased, micturition is proportionably diminished. Dr. Wilson has remarked, that Dover's powder and tartarized antimony, (which are powerful sudorifics,) when administered to individuals, invariably lessen the quantity of lithic acid in the urine*.

From the foregoing observations it would appear, that exercise is not only conducive to general health, but acts as a preventive to the disease in question, and probably may be used with material advantage even when Calculi are known to exist, the *quantum* of course to be regulated by the magnitude or irritation produced by the Calculus on motion.

It is generally believed, that acid and the acescent fluids, such as cyder, malt liquors, and French wines, favour the generation of lithic gravel: if similar results arise from the use of fresh animal

* See Dr. A. P. Wilson's experiments detailed in an appendix to his book on Fever, &c. pages 494, 500, 527, 529, and 533. See also a treatise on Gravel and Gout, by Murray Forbes, page 235, a work that will be read with pleasure and improvement by all who are interested on this subject.

food, according to the analogy which Dr. Wollaston's experiments have suggested, farinaceous and that species of food opposed to the acescent would necessarily be indicated. On these points, however, I beg to speak with much diffidence and reserve, not possessing sufficient *data* or experience to hazard any thing like decisive opinion: but from the extensive circulation of the volumes and labours of this Society, we may expect sooner or later, that the present subject will receive ample investigation and elucidation*.

* For some very interesting and valuable information on Urinary Calculi, see a paper by W. Brand, Esq. Secretary to the Royal Society, in the volume of the Philosophical Transactions of London for the year 1808; and some facts illustrative of the above paper by Sir R. Home in the same volume: also a paper by Sir Gilbert Blane in the third volume of the Medical and Surgical Transactions.

*Spring Gardens, Charing Cross,
May 10, 1818.*

APPENDIX

TO THE PRECEDING PAPER.

THIS Society having done me the honour to read in May last, a paper on the comparative infrequency of stone cases among seafaring people, I have since that period, at the request of the President and some members of the Council, made more minute inquiry throughout the medical department of the service, whether any seamen or marines had ever been invalided at the great medical establishments labouring under calculous affection; and the general reply officially returned was, that no records were preserved of the diseases for which seamen had been invalided; but the surgeons positively assert, that no instance had occurred at the royal hospitals of patients so affected being invalided previously to having undergone the operation of lithotomy*.

The period of the recess afforded me, also, the favourable opportunity of extending my researches

* All invalidings from the service must necessarily take place at one or other of the naval hospitals at home, whether the objects for survey be patients in the hospital, or are brought on shore from ships in port; and the principal medical officers of the hospital, physicians and surgeons, form part of the surveying officers on all such occasions.

to every seaport town in the kingdom where public hospitals or dispensaries had been established, and from which I could derive information by epistolary correspondence or personal application; and I embrace this opportunity to acknowledge publicly the very liberal and polite attention paid to my letters by gentlemen to whom I am personally unknown, answers having been returned to all, excepting from Edinburgh, which will be found conclusive on the subject under discussion, as far as the testimony of gentlemen of the highest professional character can vouch to the fact; and indeed, I presume the general result of this inquiry will now be deemed to have been satisfactorily established.

I shall, therefore, without farther comment, briefly lay before the Society the substance of the different communications received on the occasion.

Dr. Armstrong, physician to the Public Dispensary at Sunderland for nearly twelve years, says that he does *not* recollect having been *once* consulted by any seafaring person affected with Calculus, and that certainly *no operation* for the stone had been performed there during the above period*.

Dr. M'Leod, physician to the Westminster Ge-

* Dr. Armstrong is now physician to the Fever Institution in London, and the author of several valuable medical works.

neral Dispensary, visited Aberdeen during the last summer, and he informs me, that in the last five years *ten* operations for the stone had taken place at that institution, but that *none* of the patients were mariners or seafaring people. Notwithstanding the fact, he observes, that Aberdeen is the principal port in the north of Scotland, and the proportion of seafaring people admitted into the hospital consequently large, he cannot call to mind a single instance of a patient labouring under Calculus being admitted during the whole period of his previous attendance as pupil at that institution.

Dr. Ramsay, physician to the Newcastle-upon-Tyne Infirmary, acquaints me, that no record of the occupation of patients has hitherto been kept by the surgeons; that *twenty-one* male cases of Urinary Calculi had been admitted during the last *ten years*, and the surgeons of this establishment state, that to the best of their recollection *not one* of the description of persons under consideration had formed the subject of operation.

From the last annual report of the Newcastle Infirmary, with which I have been favoured, and which now lies before me, it appears that the admission of patients from the 1st of April 1817 to the 31st of March 1818 inclusive, is as follows, viz. in-patients 778, out-patients 636, total 1414.

Dr. Bostock has had the politeness to procure

for me the following information from a professional friend on the spot, namely, that the total number of annual admissions into the Liverpool Infirmary has been upon the average for the last *ten years* 1884, that is, 1033 in-patients and 851 out. The number operated upon for the stone in that institution during the above term of years, is stated to be *eight*, and that *none* were of the seafaring class. This fact is very remarkable: that in one of the first commercial cities in the world, no instance had occurred in the space of ten years of a seaman being admitted into the hospital for a calculous complaint; which circumstance *alone* fully demonstrates the *infrequency* of the disease among that class of men.

Dr. Rigby, now physician to the Norwich Hospital, noted for receiving a greater number of calculous cases than any hospital in Europe, acquaints me, that he has been connected with this celebrated institution ever since its first establishment in the year 1772, during which time he witnessed most of the operations performed therein, and that out of between *five and six hundred stone cases*, he cannot recollect a *single instance of a mariner having been the subject of lithotomy*. Mr. Hardy, the apothecary, who has resided many years in the hospital, makes the same remark; but he also observes, that the employment or particular occupation of the men admitted, has not been noted in the books. The Doctor mentions, however, that

he recollects a sailor having been operated upon many years ago by Mr. Lynn in the Westminster Hospital, which, it may be presumed, was about the period of his settling at Norwich. If then the Doctor could so accurately call to mind a solitary case after such a lapse of years, the probability is, that had any similar circumstance or event occurred at the institution where he has so long presided, and where also, I believe, he performed the duties of surgeon, he could hardly fail of recollecting it.

The local position of Norwich, its contiguity to Yarmouth and other seaport towns on the coast of Norfolk, Suffolk, and Lincolnshire, joined to the celebrity acquired by its surgeons for dexterity and success in operations of lithotomy, the necessary result of constant practice; from these combined circumstances, Norwich seems to be well adapted for, and to court the admission of seamen into its hospital; and yet there is no recollection of any patients of the description under consideration having been subjected to the operation of lithotomy; a still farther and striking corroboration of the infrequency of calculous diseases among seamen.

Mr. Baynton, formerly of Bristol, but now of Clifton, writes me as follows*: "I received the

* This gentleman is well known to the profession by his valuable publications.

earlier part of my education at the Bristol Infirmary, between thirty and forty years since, and at that time resided seven years in the house : I very distinctly recollect that *no sailor was ever cut for the stone during the period of my residence there ; and I am equally certain that no sailor has ever applied to me for the relief of that disease since I have been in the profession.* These facts would, perhaps, be of little value to you if they were to stand alone ; but as they are accompanied by the very interesting communication of my friend Mr. Smith, one of the surgeons of the Bristol Infirmary, I hope that the information will assist, &c."

Extract of Mr. Smith's letter to Thos. Baynton, Esq.

" My dear Sir,

" It being my intention to publish a memoir on the subject of Calculus, I have taken some pains, and therefore the following may be considered as accurate.

" The Bristol Infirmary has now been established eighty-three years, during the whole of which period there is *no stone case marked ' Mariner,'* which it *would* have been, had a sailor applied to the recommender. There has been no seafaring man cut within my remembrance, which amounts to

thirty-one years, and your own recollections will carry you ten years above that. Between us, therefore, we may answer for *forty years*.

“ Our stone cases have declined in number very remarkably of late years, which is the circumstance that first turned my attention to the subject.

FROM THE YEAR		Number of patients cut for the stone.
1735	to 1740 . . .	16
1740	1750 . . .	61
1750	1760 . . .	83
1760	1770 . . .	62
1770	1780 . . .	40
1780	1790 . . .	36
1790	1800 . . .	32
1800	1810 . . .	16
1810	1818 . . .	10

“ From 1750 to 1760, there passed the books as in and out-patients 29,604, and during the last ten years there are probably about 31,000*.

“ The cases of lithotomy have come to us com-

* In the 29,604 admissions from 1750 to 1760, the number of stone cases is stated to be 83, which gives *one* in 356; and from the 31,000 admissions during the last ten years, we must deduct two-tenths—the ten stone cases that occurred within the last eight years, we shall then find gives *one* in 2480: average of the two periods *one* in 585.

paratively in the following order of frequency, as to the city and neighbouring counties :

“ Bristol,
Somersetshire, Bath included,
Wiltshire,
Gloucestershire,
South Wales,
Devonshire.

No cases from North Wales or Herefordshire.”

In addition to the mass of information already adduced, I felt particularly desirous to acquire some knowledge on the subject from Ireland, that no possible source might be left unexplored that could enlighten, or tend to remove doubts on the decision of the question. My friend and neighbour Dr. Boyton, therefore, obligingly endeavoured to supply the wished-for intelligence ; but unfortunately he proved unsuccessful, the desired information not being attainable.

Bearing in mind, however, the experiments of Dr. Wollaston, as stated at page 460, I availed myself of the opportunity afforded by meeting last summer one of the professors of the Dublin College, to inquire whether Urinary Calculi were equally prevalent in the sister island as in England ; for it is well known that the peasantry of Ireland are seldom able to indulge in the luxury of animal food ; and his reply was, that in his

opinion, the disease was much less frequent there than in England. Should the aforesaid information prove to be justly founded, the analogy suggested as probably subsisting between carnivorous birds and human subjects, as far as regards the generation of lithic acid, may be considered as pretty well established.

Spring Gardens, Nov. 16, 1818.

FURTHER OBSERVATIONS
ON THE
PROXIMATE PRINCIPLES
OF THE
URINE.

By W. PROUT, M.D.

Read June 24, 1818.

THE principles of which I purpose at present to speak, are lithic acid, oxalic acid, and cystic oxide; and my object will be to point out the relation of these different principles, and of urea, and sugar formerly described, with the albumen of the blood. I have still doubt respecting the composition of the phosphates, and therefore postpone the consideration of them for the present.

Of Albumen. The blood of a person labouring under a slight inflammatory affection, but otherwise in good health, was the subject of experiment. The serum was separated and dried in the manner formerly described. A portion was then analysed,

with the view of ascertaining the quantity of saline and other substances present, in order that they might be allowed for*. Four grains of what was considered as pure albumen, reduced to an impalpable powder and burnt with the oxide of copper, yielded upon an average of

Water - - 2.8 grs.

Mixed Gases 17.75 cubic inches,
of which 15.65 c. i. were carbonic acid, and 2.1
c. i. azote.

Hence this quantity consists of

Hydrogen - .311

Carbon - - 1.990

Azote - - .622

2.923

Oxygen - - 1.077

4.000

which very nearly corresponds with

7 atoms hydrogen	8.75	} or per cent. of	hydrogen	7.77
7½ atoms carbon	56.25		carbon	50.00
3 atoms oxygen	30.00		oxygen	26.66
1 atom azote	17.5		azote	15.55
	<hr/> 112.50 <hr/>			<hr/> 100.00 <hr/>

* Another portion was coagulated and well washed to remove the foreign substances. The results were very nearly the same as with the uncoagulated albumen when the proper corrections were made.

The albumen ovi yielded exactly the same results. According to MM. Gay Lussac and Thénard, the albumen ovi is composed of

Hydrogen	-	7.540
Carbon	- -	52.883
Oxygen	- -	23.872
Azote	- -	15.705

100.

results which do not differ much from the above *.

I acknowledge I did not expect to find this principle to be so simply constituted, nor in fact to be formed of definite proportions of its elements. I was led to examine it accidentally: my friend Dr. Elliotson having furnished me with the blood of a person labouring under extreme diabetes, it struck me that a comparative examination of this with healthy blood, might throw some light upon the nature of this unmanageable disease. I was induced therefore to undertake it, but with the intention principally of determining whether the quantity of azote was the same in each. The results were the following:

It may be proper to premise that the diabetic blood I examined, presented the usual appearances of healthy blood. Sometimes in this disease the

* See Recherches Physico-chimiques, ii. 332.

serum has a wheyish or milky appearance, but this has been likewise observed in other diseases, and even in the blood of healthy persons when drawn some time after a meal.

Specific gravity of the serum of diabetic	
blood - - - - -	1029.5
_____ of the urine of the same	
person, voided at the same time -	1044.8

100 grains of the diabetic serum evaporated and dried to the standard formerly mentioned, left 10 grains of solid matters, which, upon analysis, were found to consist of

Albumen - - - - -	8.7
Lactates and animal matters usually	
existing in the blood - -	.6
Salts - - - - -	.7
	<hr/>
	10.
	<hr/>

which very nearly coincide with the proportions ascertained by Dr. Marcet and Berzelius, to exist in the serum of healthy blood*.

100 grains of the diabetic urine, evaporated and dried as before, left 11.7 grains, nearly the whole of which was sugar.

Portions of albumen from the serum of this dia-

* See Vol. II. p. 270. and Vol. III. p. 230. of the Medico-Chirurgical Transactions.

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Carbon	- -	52.889
Oxygen	- -	23.872
Azote	- -	15.705

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	<hr/>
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Portions of albumen from the serum of this dia-

* See Vol. II. p. 270. and Vol. III. p. 230. of the Medico-Chirurgical Transactions.

betic blood, dried and analysed as before, yielded *precisely the same results* as albumen from the serum of healthy blood.

To ascertain the relative proportions of azote present in the diabetic urinous extract and the extract from healthy urine, portions of them were burnt with the oxide of copper. The results were, that 100 parts of the diabetic extract, (abstracting alkaline and earthy salts) yielded only 6.5 parts of azote, while the same quantity of extract from healthy urine yielded from 35 to 40 parts of the same principle.

To obviate the objection that the saccharine matter of the urine might be formed from the other principles of the blood, and not from the serum, comparative experiments were made with the *cruor* of healthy and of diabetic blood. The results were precisely similar as to the quantity of azote in both, and at the same time the quantity of azote did not differ much from that found to exist in the serum above mentioned.

I shall at present leave my readers to draw their own conclusions from these experiments.

Lithic acid.—I stated in my former communication that 4 grains of lithic acid yielded 16.5 cubic inches of mixed gases, of which 5.5 cubic inches were azote and 11. c. i. carbonic acid. The total

bulk of the mixed gases, 16.5 cubic inches, is very nearly correct; but misled partly by the authority of M. Gay Lussac*, and partly by my modes of measuring and estimating the proportion of atmospheric air supposed to be present in the apparatus, I overrated the proportion of azote, and consequently underrated that of carbonic acid. The correct proportions, as recently obtained in numerous experiments, appear to be

Total 16.75 c. i. of which
 4.2 c. i. is azote, and
 12.55 c. i. carbonic acid.

The quantity of water was also a little overrated in my former experiments. The correct quantity as obtained from 4 grains of absolutely pure lithic acid, procured from the excrements of the boa constrictor, is .805 grains. Four grains of lithic acid then are composed of

Hydrogen	-	-	.089
Carbon	-	-	1.595
Azote	-	-	1.245
			<hr/>
			2.929
Oxygen	-	-	1.071
			<hr/>
			4.000
			<hr/>

which very nearly correspond with

* M. Gay Lussac states, that he found the proportion of the carbon to the azote in lithic acid, to be nearly as 2 to 1. See *Annales de Chim.* xcvi. p. 53.

1 atom hydrogen	1.25	} or per cent. of	2.22 hydrogen
3 atoms carbon	22.5		40.00 carbon
1½ atoms oxygen	15.0		26.66 oxygen
1 atom azote	17.5		31.11 azote
<hr/>			
36.25			100.00
<hr/>			

I was led to repeat my experiments on lithic acid, from a certain want of analogy between the results I formerly obtained, and the composition of other substances existing in the urine. And I may here observe, once for all, that a more extensive experience in the analysis of organic substances has made me acquainted with various circumstances which I never suspected, and which are of the utmost importance in this most difficult department of practical chemistry. Even yet I have not surmounted all the difficulties, so as to be able to succeed beyond a doubt in any one given experiment. A circumstance, which, by rendering numerous repetitions of the same experiment necessary, has made the present investigation exceedingly laborious.

Oxalic acid.—This acid is a constituent of that most distressing and refractory species of calculus, commonly called *mulberry calculus*. Various attempts have been made by different chemists to analyse this acid; but if we may guess from their apparently discordant results, without

success. For a very long time I could make nothing of it, but by degrees, as the composition of other organic substances became known, the nature of this also began to be developed, and at length I flatter myself that I have succeeded in ascertaining its composition.

Four grains of this acid in its crystallized state uniformly yield very nearly 6.3 cubic inches of carbonic acid gas, and 1.65 grains of water; results which I obtained from the commencement of my experiments, but which I could not reconcile with the doctrines of the atomic theory then generally received. From these results it appears that four grains of this acid consist of

Hydrogen	.183
Carbon	- .800
	<hr/>
	.983
Oxygen	8.017
	<hr/>
	4.000

which correspond almost exactly with

4 atoms hydrogen	5.	} or per cent. of	4.44
3 atoms carbon	22.5		20.00
8½ atoms oxygen	85.		75.55
	<hr/>		<hr/>
	112.5		100.00
	<hr/>		<hr/>

The above results being all that are necessary for my present purpose, I shall take another opportunity of reconciling my analysis with those of others, as this, from its being a mere chemical question, would, I conceive, be misplaced here.

Cystic oxide.—For an opportunity of submitting this rare species of calculus to an analysis, I am indebted to Dr. Marcet.

Four grains of this substance rendered as pure as possible, and allowance being made for the earthy salts mixed with it, yielded upon an average of

Mixed gases 11 cubic inches, of which
 1.6 c. i. was azote,
 9.4 c. i. were carbonic acid,
 and 1.85 grains water.

Hence this quantity consists of

Hydrogen	.205
Carbon	1.195
Azote	.474
	<hr/>
	1.874
Oxygen	2.126
	<hr/>
	4.000

which almost precisely correspond with

3 atoms hydrogen	3.75	} or per cent. of	5.00
3 atoms carbon	22.5		30.00
4 atoms oxygen	40		53.33
$\frac{1}{2}$ atom azote	8.75		11.66
	<hr/> 75. <hr/>		<hr/> 100. <hr/>

Purpuric acid.—It was my intention to have stated here the analysis of this curious principle, but my stock, which was originally small, has been quite exhausted, without my being able to satisfy myself of its exact composition. The analysis I gave in the last volume of the Transactions of the Royal Society, was made on very small portions of the acid, and many times repeated with the same results. It consequently appeared to me at the time to be correct, but from what I have since observed, I have some doubts upon the subject. I postpone, therefore, the further consideration of this principle, till I have an opportunity of verifying my conjectures.

Pink sediment.—Some time ago I examined two or three specimens of this substance; which, as is well known, is deposited from the urine of those labouring under febrile and inflammatory diseases. In every instance I found distinct traces of *nitric acid*. The method adopted to discover this was to digest a little pure barytes with the sediment. The nitrate of barytes thus formed was of course

soluble, while the other compounds were mostly insoluble. Sulphate of potash was now added, and the nitrate of potash obtained was in one instance procured in the state of crystals, and in all the others rendered distinctly perceptible by its mode of combustion with paper and other substances containing carbon.

Sediments of a very different nature are often confounded under the name of *pink* and *lateritious* sediments; hence, probably, many of them do not contain nitric acid. One of those I examined was from a gouty subject, and was deposited after a slight febrile attack. Its colour was a deep *brick red*. The others were also deposited during febrile attacks, but not from the urine of gouty subjects; their colour was lighter and more approaching a *pink*; and in these the nitric acid appeared less abundant.

I do not know the exact composition of those pink sediments into which nitric acid enters as a constituent, but they appear to be composed of lithic, nitric, and purpuric acids, united to some base, perhaps ammonia or soda, and not to owe their properties to a distinct acid principle (the *rosacic* acid) as maintained by M. Proust, at least I never could obtain any satisfactory evidence of the existence of such an acid. If the above view be admitted, it may be probably explained by supposing that the nitric and lithic acids are se-

creted together, and that the purpuric acid, ~~or~~ rather the purpurate of ammonia on which the colour depends, is formed by the action of the nitric upon the lithic acid in the usual manner.

I shall conclude for the present, with the following tabular view of the results*.

100 parts contain	Hydrogen.	Carbon.	Oxygen.	Azote.	Weight of atom.	Sugar being 1.
Sugar	6.66	40.00	53.33	—	18.75	1
Urea	6.66	20.00	26.66	46.66	37.5	2
Lithic Acid...	2.22	40.00	26.66	31.11	56.25	3
Cystic Oxide	5.00	30.00	53.33	11.66	75.00	4
Oxalic Acid .	4.44	20.00	75.55	—	112.5	6
Albumen.....	7.77	50.00	26.66	15.55	112.5	6

It would be premature in the present state of this investigation, to attempt to draw any conclusions from the above experiments. I cannot, however, dismiss the subject, without directing the attention of my readers to the extraordinary relations

* I wish to remark here, that the numbers representing the weights of the atoms may be placed very differently according as different views are taken of the subject. I have not yet fully made up my mind upon this part of the inquiry, but have placed the numbers in the above order, that the extraordinary relation existing among them might be more conspicuous, and because this arrangement, in the present state of our knowledge, is as good as any other.

that exist among the above numbers, and observing that I am engaged in the investigation of the laws which they obey—laws which appear to regulate not only the operations of the animal economy, but the whole material world.

*Note subjoined as a Postscript to Mr. Rumsey's
Paper on the Coincidence between Worms and
Hæmoptysis.*

Nov. 4, 1818.

THE following fact, which has appeared in the Edinburgh Medical and Surgical Journal for October, 1818, communicated by Mr. Robert Hartle, adds to my mind some confirmation of the opinion I have advanced, and encourages me to hope that the evidence in support of it will accumulate so as very soon to settle the question, and bring more within controul, one of the sources of that malady, consumption, which so much afflicts this island. The account also would lead me to believe, that this source of that baneful disease was common in very different latitudes to ours, and therefore possibly a source of it where climate is less disposed to produce it.

CASE I.—“ William Howell, aged 36, a private soldier in the Royal West India Rangers, was admitted into the hospital on the 23d September, 1817, punished. On the night of the 28th of September, he was suddenly attacked with hæmoptysis. The usual remedies were immediately applied, and although fast recovering from this disease, he appeared to daily decrease in strength. He became very emaciated, and complained of griping pains of his belly, particularly before breakfast, with some purging, and pain in his stomach. His emaciated state particularly attracted my notice on the morning of the 22d October, when his pulse was regular, skin natural, tongue clean,

appetite voracious; and, to make use of his own words, 'he was never full.' I directed him to examine his stools, and see if he could discover any worms. He immediately said he was in the habit of passing them very frequently. On the 23d October he shewed me three, which, although flat, were not ribbed like the tape-worm, each was about two inches long. Still, however, the appearance of them led me to believe that this was a case of *tænia*, and I resolved to try the terebinthina. I desired him to abstain as much as possible from food that day, and on no account take his supper. He complied, and on the morning of the 24th October, I gave him two ounces of the Ol. Terebinth. undiluted. I visited him very frequently during the morning, and finding at twelve o'clock (six hours after he had taken it) that he had had no stool, I ordered him two ounces of the Ol. Ricini. In half an hour after he had taken it he passed a narrow tape-worm, nine feet one inch long.

"Notwithstanding the length of time between his taking the turpentine and that of having a stool, no ill effects were produced, and the only strange sensation he complained of was that of intoxication. On inquiry into the general character of this man, I find he is given to drink freely ardent spirits, which I think in a great measure accounts for the tardiness of the turpentine's effects. His appetite has since become natural, and his general health daily improving."

*Detachment General Hospital,
Antigua, 24th Dec. 1817.*

I would also submit as a fact which bears a relation to this point, that the subject of the third case in my

paper is now in health, having lately produced a healthy child, which in a few weeks after birth was troubled with *Ascarides*: a fact which seems strongly to mark the cause as connected with constitution, and rather favours the opinion of an origin in some morbid state or secretion in the alimentary canal, than a derivation *ab ævo*. Its food has consisted only of the mother's milk, and bread boiled in water with sugar.

Beaconsfield, Nov. 4, 1818.

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Sigurd's scalp.

See also vol. IX.

Fig 1
Ossific deposit in the Periosteum & that
in a Coagulum of Blood
15th Day

Fig 2

a

Fig 3
New Bone & Canals

a

Nat. Size



b

J. Havers del

J. I. Wedgwood sculp

PLATE IV.

Fig 4
Advancing Ossification 23rd Day
Nat Size



Fig 5
Ossification in Periosteum greatly Magnified

Fig 6
The appearance of Complete Union
32nd Day



Fig. 7.

Communion of Canals between the Old & New Bone.

